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FLATHEAD RIVER BASIN
ENVIRONMENTAL IMPACT STUDY

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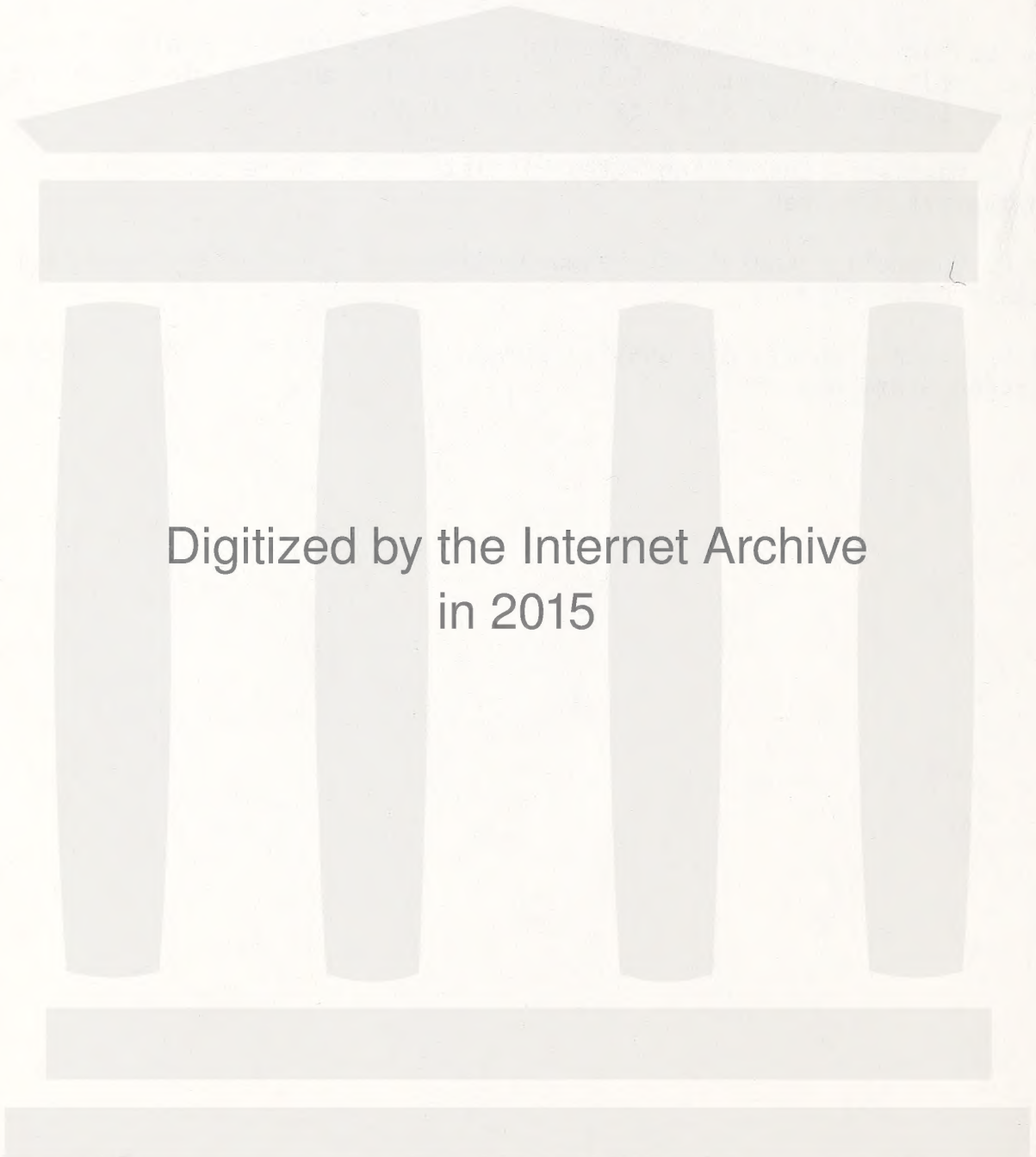
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EXECUTIVE SUMMARY

Recognizing the need to protect the high quality environment of the Flathead River Basin, Congress in 1977 directed the Environmental Protection Agency (EPA) to study the possible environmental impacts of resource development in the Flathead River Basin. The study is to be carried out over a five-year period commencing in 1978.

This report summarizes the first year of air quality, meteorology, and visibility data collected by the Air Quality Bureau of the Montana Department of Health and Environmental Sciences. The air quality data covers particulates, particle size, sulfates, nitrates, and trace elements. The meteorology data includes surface and upper air parameters. The visibility data includes scattering coefficients, turbidity, and diffuse radiation.

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I. INTRODUCTION

Recognizing the need to protect the high quality environment of the Flathead River Basin, Congress in 1977 directed the Environmental Protection Agency (EPA) to study possible environmental impacts of resource development in the Flathead River Basin. In response the EPA cooperated with state and local government bodies and interested individuals to establish the Flathead River Basin Environmental Impact Study.

The Flathead Study is directed by a 15-member Steering Committee composed of a representative of EPA, state government, the Confederated Salish-Kootenai Tribal Council, local governments, area citizens, and several federal agencies. The overall goal of the Steering Committee, and of the Flathead Study itself, is to provide a data base to help citizens, government and industry in the Flathead River Basin make decisions concerning the environment. More specifically, the Study will develop the analytical ability to assess potential impacts and provide necessary management tools to control the various levels, types, and locations of developmental activity.

The Air Quality Bureau (AQB) was requested by the Steering Committee early in 1978 to assess the need for additional air quality studies and prepare a proposal for the air quality work. The AQB identified five specific goals or needs for the Flathead Basin air quality studies. These goals were:

1. To quantify the existing air quality within the Basin;
2. To identify existing levels and sources of air pollution which affect the Basin;

3. To quantify the meteorology of the Basin at both low and high altitudes;
4. To develop the capability to assess the effects of man's activities upon the air quality of the Basin; and
5. To develop guidelines to protect and enhance the air quality of the Basin.

The air quality monitoring study plan specifies several objectives, broken down by year for the five study years.

During the initial year of study, June 1978 through June 1979, the upper meteorological system that had been operating at the Glacier International Airport continued to function. Two surface wind stations also were installed and operated in the area. A contracting meteorologist was hired to handle the instrument operation and data analysis. The following sites were monitored with the samplers listed during 1978:

Moose City (Canadian border) (see Figure 1) - high volume sampler (total suspended particulate)

Polebridge - dichotomous sampler (particulate sizing instrument)
- surface wind station

Glacier International Airport - pilot balloon program (upper level wind flow)
- temperature sonde system (inversion heights and temperature lapse rate)
- acoustic radar (relative stability, mixing heights, and inversion heights)
- surface meteorological system (pressure, wind, temperature, dewpoint)

- nephelometer (visibility)
- pyranometer (two wavelengths - total solar radiation)
- pyrheliometer (two wavelengths - direct solar beam)
- dichotomous sampler

Ronan - high volume sampler

Polson - dichotomous sampler

- surface wind system

Several other AQB monitoring sites were continued in operation:

Columbia Falls area - high volume samplers (two)

- surface wind system

Kalispell - high volume sampler

The AQB also provided analysis of the particulate filters for nitrates and sulfates.

It was specified in the study plan that a final report containing an analysis of all data collected during 1978 would be published. This report was to summarize various aspects of the meteorology, air quality, and visibility in a technical format.

The budget requested for 1978 was as follows:

Equipment	$27,000
Supplies	14,000
Contractual	26,000
Travel	3,000
	$70,000

During 1979 the various sites started during 1978 were continued. In addition, particle size instruments were to be installed adjacent to high volume samplers in Kalispell, Ronan, and Columbia Falls. These instruments provide valuable data on the amount of respirable and non-respirable suspended dust in the air.

Further, the AQB was to conduct a detailed inventory of the area and point sources of air pollution in the Flathead and Lake Counties. This would include all major air pollution sources contributing to air pollution of the valley, whether they were located in the valley or outside it. The primary pollutants to be inventoried included particulates, sulfur dioxide, carbon monoxide, hydrocarbons, and nitrogen dioxide. The proposed budget for 1979 work was:

Equipment	$16,000
Supplies	20,000
Contractual	50,000
Travel	3,000
	$89,000

Following the completion of 1979 sampling, a second detailed report will summarize the data analysis for 1978-79 data collection. The report will cover all phases of the air quality, meteorology, and visibility study.

During 1980, the existing network would continue to be operated. Variability in meteorological conditions warrants several years operation to insure a valid data sample. An upper air meteorological site is scheduled for installation in the Ronan area. This additional site would require an additional contracting meteorologist and various supplies. The Ronan area is subject to a much different air stagnation problem than the northern Flathead Valley. The Ronan area meteorology is influenced by the Flathead Lake and the surrounding mountains. During the 1980 study period a modeling study is supposed to be performed. The modeling analysis would consist of two parts: (1) a wind flow model; (2) a pollutant "carrying capacity" model.

The wind flow model would use all existing surface and upper level wind sites in conjunction with the topography to show exactly how the wind flows throughout the Flathead Valley from the North Fork of the Flathead to the Ronan

area. The model would show flows for various meteorological patterns determined to be the most dominant or crucial to the area with respect to air quality and meteorology. The model would be valuable for siting of new industries and other work where it is useful to know where the pollutants will be carried.

The second part of the modeling would determine the carrying capacity of the Flathead Valley. The carrying capacity is determined much as a range manager determines the number of animals permitted to graze on a pasture except in this case the question regards how much air pollution is compatible with various types of land use. The output from the first modeling step would be used as input along with the air quality data to determine an atmospheric constraint index or air quality restrictions for each grid on the map.

It is evident that these two models would be extremely useful to government bodies concerned with growth of the Flathead area. This modeling was not scheduled until 1980 to permit collection of data on upper air meteorology and air quality in the Ronan area.

The proposed budget for 1980 is as follows:

Supplies	$38,000
Contractual	85,000
Travel	7,000
Equipment	24,000
	$154,000

Following the 1980 collection period, a detailed report is to summarize 1978-1980 data analysis and the modeling analysis.

Work similar to that performed during the previous years is envisioned for 1981-1982. It is difficult to predict problems that far in advance, but budgetary flexibility is maintained to allow for the possible need for work beyond what is now planned. During the fifth year the sampling would be completed

and all the previous analysis tied together into one large summary report.

The proposed budget for 1981 and 1982 is as follows:

Contractual	$45,000
Supplies	27,000
Travel	5,000
	$77,000

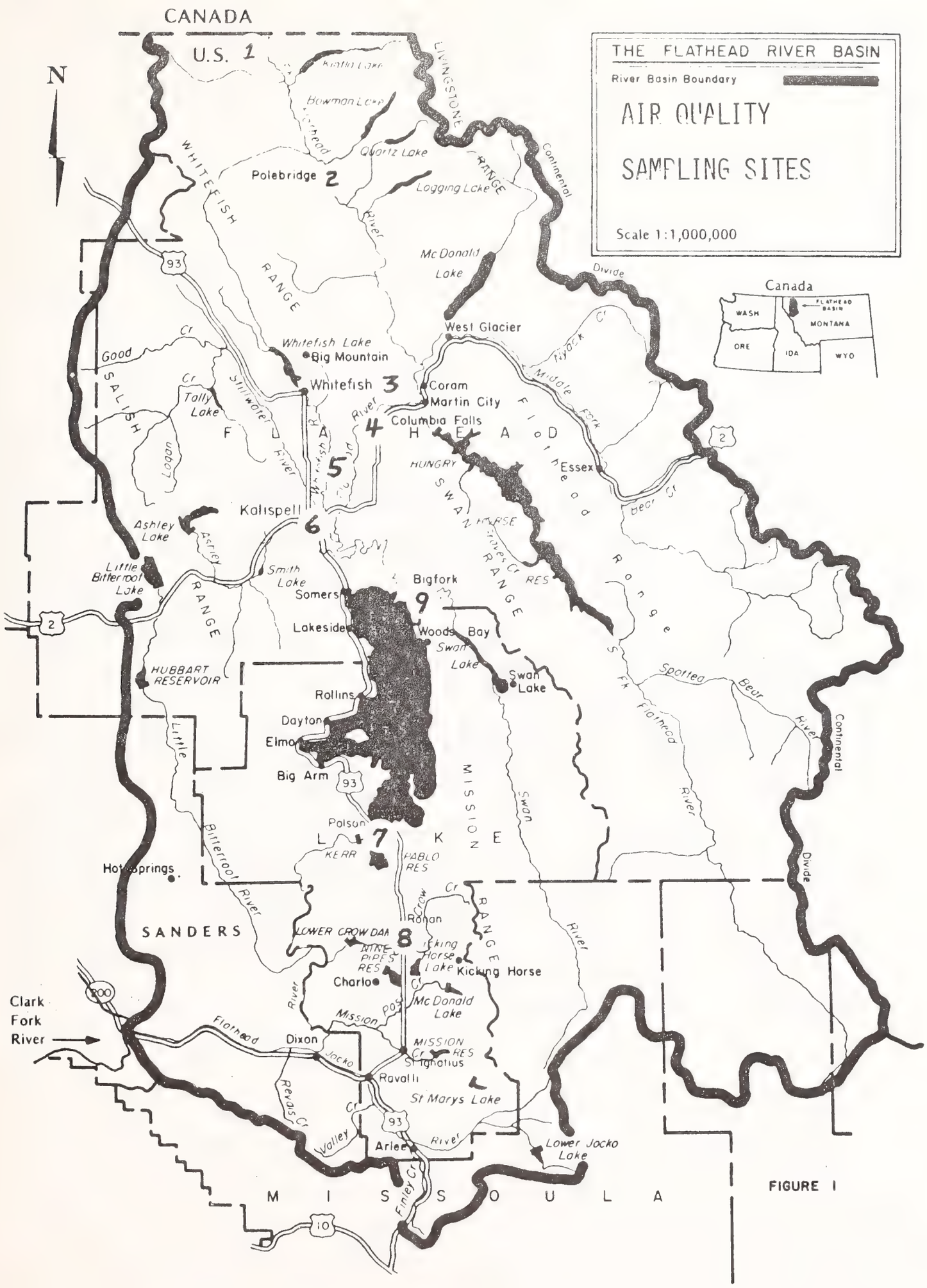

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THE FLATHEAD RIVER BASIN
River Basin Boundary
AIR QUALITY
SAMPLING SITES
Scale 1:1,000,000
Canada
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Kalispell
Whitefish
Whitefish Lake
Big Mountain
West Glacier
Coram
Martin City
Columbia Falls
Essex
Bigfork
Somers
Lakeside
Woods Bay
Swan Lake
Rollins
Dayton
Elmo
Big Arm
Polson
Hot Springs
Ronan
Kicking Horse
Charlo
Mc Donald Lake
Dixon
Ravalli
St Marys Lake
Arlee
Lower Jocko Lake
Ashley Lake
Little Bitterroot Lake
Smith Lake
HUBBART RESERVOIR
Tally Lake
Logan
Good
Quartz Lake
Logging Lake
Bowman Lake
Mc Donald Lake
Swan Lake
Clark Fork River
Flathead
Jocko
Mission
Valley
Spotted Bear River
Continental Divide
WHITEFISH RANGE
SALISH
FLATHEAD
MISSION
SWAN RANGE
SANDERS
MISSOULA
93
2
200
10

FIGURE 1

Flathead Basin Air Quality Sampling Sites

	Parameters Sampled
1 - Moose City	Total Suspended Particulates
2 - Polebridge	Particle Size, Wind
3 - Water Supply	Total Suspended Particulates, Wind
4 - Columbia Falls	Total Suspended Particulates
5 - Glacier International Airport	Particle Size, Upper Air and Surface Meteorology, Visibility
6 - Kalispell	Total Suspended Particulates
7 - Polson	Particle Size, Wind
8 - Ronan	Total Suspended Particulates
9 - Bigfork	Total Suspended Particulates

II. AMBIENT AIR QUALITY

A. Particulates

Two methods of particulate monitoring were used in the Flathead Basin during 1978-79. The first method used a high volume sampler. This sampler draws the ambient air through a pre-weighed filter for a twenty-four hour period. Following the sample collection, the filter is again weighed. This sampling method measures the particles (or dust) suspended in the air over a large size range, hence the term "total suspended particulates". Total suspended particulate (TSP) monitoring was performed at four sites in the Basin during 1978 and at six sites in 1979.

Tables 1 and 2 summarize the TSP levels at these sites during 1978 and the first six months of 1979, respectively. The tables show the highest and second highest TSP concentrations along with the arithemtic average for that period. The data appears to indicate that the greater the population and industrial activity the higher the TSP concentrations. Kalispell recorded the highest twenty-four hour and arithmetic average concentrations during 1978 and 1979, whereas Moose City at the U.S.-Canada border recorded the lowest twenty-four hour and arithmetic average concentrations for both 1978 and 1979. The arithmetic average concentrations at Kalispell (Strom) during 1978 and 1979 were 65 and 98 micrograms per cubic meter (ug/m^3) respectively. The arithmetic average concentrations in Ronan were also high in the first six months of 1979 at 90 ug/m^3.

Table 3 shows the monthly trend in TSP levels at the Kalispell site. Only eight months of data is available at this site but the data does show

a trend toward highest TSP levels in the spring (March and April) and lowest levels in the winter (December and January). Table 4 shows the monthly trend for Ronan site for the same eight months. This site also shows a seasonal trend similar to that at the Kalispell site except that the highest TSP levels occurred in June. However, high TSP levels did occur in the spring (April and May) with fairly low levels in the winter (December and January).

Table 5 shows the same monthly trend for the Water Supply site north of Columbia Falls. This site has less impact from population or industrial activity than the Kalispell or Ronan sites. The Water Supply site also has almost one and one-half years of data available. Analysis of the data however, does not show any apparent trend. TSP concentrations are fairly low throughout the year with the highest monthly average occurring in October, 1978 (39 ug/m^3). The lowest monthly average occurred in December, 1978 (8 ug/m^3)

The second device for measuring the particulates in the Flathead Study was a dichotomous sampler. This sampler works on the filter technique much as the high volume sampler does, but with the dichotomous sampler, two filters are used to separate the particles into two size ranges. These ranges were 1) less than 2.5 microns, and 2) from 2.5 to 15 microns. The high volume sampler on the other hand collected particles up to 100 microns. Therefore, the two measurement methods cannot be compared directly. Three sites in the basin had dichotomous samplers during the first year of the study. These were Glacier Internation Airport, Polson, and Polebridge. Tables 6 through 8 summarize the data for these sites. The results from the Airport site and the Polson site appear very similar with the biggest difference between the sites occurring in the concentration of particles from

2.5 to 15 microns. The concentration of smaller particles (less than 2.5 microns) appears similar at the Airport and Polson sites. At the Airport site roughly one-half of the concentration of particles occurs on each size range. However, at the Polson site, there were approximately twice as many larger particles as smaller. The month with the lowest concentration of small particulates at the Airport site was December with 7.7 ug/m^3. The highest concentration of small particles occurred during January with 27.5 ug/m^3. The larger particle concentration was highest in October and lowest in January with 23.1 and 7.0 ug/m^3, respectively. This trend of highest and lowest values was similar at the Polson site. The highest concentration of small particles occurred in January and the lowest concentration occurred in December with 27.8 and 8.7 ug/m^3 respectively. The larger particle concentration was highest in October and lowest in January with 49.9 and 6.5 ug/m^3 respectively.

The third dichotomous sampler was located at Polebridge. The sampler at this site recorded much lower total particulate concentrations and lower concentrations of large particles than either the Polson or Airport sites. However, the concentrations of small particles was similar at all three sites except in January. The concentration of small particles in January at the three sites was 27.5, 27.8 and 6.8 for the Airport, Polson and Polebridge sites, respectively. The ratio of the concentration of large particles to small particles was roughly 1 to 2.5. This ratio is reversed from that of the other two sites indicating that with increased population and industrial activity, the concentration of large particles increases whereas the concentration of small particles remains fairly constant.

B. Sulfates and Nitrates

Sulfate and nitrate analyses were performed on the particulate filters

from the high volume sampler. The results of these analyses are presented in Tables 9 through 19. Tables 9 and 10 summarize the sulfate concentrations for 1978 and the first part of 1979. The results are for the high volume sampler sites discussed under the particulate section. The results show highest sulfate concentrations occurred at Kalispell and Ronan in 1978 and at Kalispell and the Glacier Airport in 1979. Lowest sulfate concentrations occurred at the Moose City site during both years.

The monthly trend in sulfate levels is shown in tables 11 through 13 for the Kalispell, Ronan, and Water Supply sites. The Kalispell sulfate levels indicate highest concentrations occurring in January, 1979 and lowest concentrations in May 1979. This same pattern is followed at the Ronan site. The Water Supply site north of Columbia Falls measured highest sulfate levels in February, 1978 and lowest levels in December, 1978.

Tables 14 through 18 show similar statistics for the nitrate concentrations measured in the basin. Tables 14 and 15 show the average nitrate levels that occurred in 1978 and 1979. During 1978 the highest average nitrate level occurred at the Kalispell site (1.6 ug/m^3) whereas the lowest occurred at Moose City (0.3 ug/m^3). The highest one time reading in 1978 occurred at the Water Supply site. During 1979 the highest average nitrate levels occurred at the Kalipell site (2.6 ug/m^3) whereas the lowest occurred again at Moose City (0.6 ug/m^3). The maximum one time reading occurred at the Kalispell and Ronan sites (6.6 ug/m^3).

Tables 16 through 18 show the trend of monthly levels of nitrates at the Kalipell, Ronan, and Water Supply sites. At the Kalispell site, the highest average nitrate level occurred in February, 1979 (3.9 ug/m^3) whereas the lowest occurred in October, 1978 (1.0 ug/m^3).

The Ronan site measured the highest average monthly nitrate levels in

January, 1979 (3.8 ug/m^3) whereas the lowest occurred in December, 1978. The Water Supply site north of Columbia Falls indicated a trend of lowest nitrate levels in the summer and highest levels in the winter. The lowest monthly average occurred in June, 1978 (0.3 ug/m^3) whereas the highest monthly average occurred in January 1978 (2.0 ug/m^3).

As with the particulate levels, sulfate and nitrates increased as population and industrial activity increased. Highest sulfates and nitrates were measured in Kalispell with lowest levels measured in Moose City.

C. Trace Elements

Table 19 summarizes the trace element concentrations measured at the Water Supply site north of Columbia Falls. Various trace element concentrations are listed for 1978. Comparison is also made to the TSP levels that occurred over the same time period. All concentrations of trace elements are low with aluminum occurring in the highest concentrations and arsenic occurring in the lowest concentrations.

TABLE 1

Flathead Basin Air Quality Levels*
Parameter: Total Suspended Particulates
Collection Period: 1978

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Water Supply-Columbia Falls	59	56	25
Moose City	40	18	14
Kalispell-Sherman[a]	411	294	114
Kalispell-Strom[a]	110	105	65
Ronan	170	120	48

*Values in micrograms per cubic meter
[a]Sherman site moved to Strom in September 1978

TABLE 2

Flathead Basin Air Quality Levels*
Parameter: Total Suspended Particulates
Collection Period: Jan.-June 1979

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Water Supply-Col. Falls	63	50	26
Moose City+	15	12	10
Glacier Airport	120	117	57
Kalispell-Strom	343	289	98
Polson	162	149	66
Ronan	311	179	90

*Values in micrograms per cubic meter
+Only two months of data

TABLE 3

Flathead Basin Air Quality Trends*
Parameter: Total Suspended Particulates
Site: Kalispell-Strom

Months	Arithmetic Mean	Maximum Reading
October, 1978	85	110
November	67	99
December	43	.63
January, 1979	41	59
February	58	59
March	164	343
April	147	184
May	93	118

*Values in micrograms per cubic meter

TABLE 4

Flathead Basin Air Quality Trends*
Parameter: Total Suspended Particulates
Site: Ronan

Months	Arithmetic Mean	Maximum Reading
November, 1978	85	170
December	19	32
January, 1979	36	58
February	49	64
March	76	123
April	94	168
May	130	147
June+	245	311

*Values in micrograms per cubic meter
+Only partial month of data

TABLE 5

Flathead Basin Air Quality Trends*
Parameter: Total Suspended Particulate
Site: Water Supply-Col. Falls

Months	Arithmetic Mean	Maximum Reading
January, 1978	23	55
February	25	47
March	33	42
April	13	21
May	26	46
June	21	33
July	28	48
August	29	37
September	26	30
October	39	59
November	24	53
December	8	16
January, 1979	32	48
February	27	50
March	21	37
April	22	63
May	28	44
June+	26	34

*Values in micrograms per cubic meter
+Only partial month

TABLE 6

Flathead Basin Air Quality Trends*

Site: Glacier Airport

Months	Particles < 2.5 microns		Particles 2.5 to 15 microns		Particles < 15 microns	
	Mean	Max. Reading	Mean	Max. Reading	Mean	Max. Reading
September,1978	15.0	16.7	15.7	24.6	30.7	41.1
October	19.1	40.4	23.1	44.7	42.2	85.1
November	16.8	29.5	11.5	17.1	28.3	41.1
December	7.7	12.1	10.8	12.9	18.5	19.4
January, 1979	27.5	40.1	7.0	10.7	34.5	50.8

*Values in micrograms per cubic meter

TABLE 7

Flathead Basin Air Quality Trends*

Site: Polson

Months	Particles < 2.5 microns		Particles 2.5 to 15 microns		Particles < 15 microns	
	Mean	Max. Reading	Mean	Max. Reading	Mean	Max. Reading
September,1978	15.1	16.8	21.8	29.8	36.9	46.6
October	16.1	30.4	49.9	90.1	65.9	99.6
November	14.1	27.3	19.9	29.3	34.0	53.5
December	8.7	9.6	14.1	20.0	22.8	27.2
January,1979	27.8	35.5	6.5	7.9	34.3	41.2

*Values in micrograms per cubic meter

TABLE 8

Flathead Basin Air Quality Trends*

Site: Polebridge

Months	Particles < 2.5 microns		Particles 2.5 to 15 microns		Particles < 15 microns	
	Mean	Max. Reading	Mean	Max. Reading	Mean	Max. Reading
September,1978	14.1	21.1	6.3	7.0	20.4	26.5
October	13.4	24.1	6.5	13.2	19.9	36.8
November	11.7	15.7	5.7	7.3	17.4	23.0
December	6.5	8.1	2.6	3.2	9.1	11.2
January,1979	6.8	7.5	2.3	2.4	9.0	9.9

*Values in micrograms per cubic meter

TABLE 9

Flathead Basin Air Quality Levels*
Parameter: Sulfates
Collection Period: 1978

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Water Supply-Col. Falls	12.8	9.7	3.2
Moose City+	6.1	4.2	3.0
Kalispell-Strom	8.2	6.0	4.5
Ronan	6.5	5.1	3.7

*Values in micrograms per cubic meter
+Only partial year sampled

TABLE 10

Flathead Basin Air Quality Levels*
Parameter: Sulfates
Collection Period: 1979

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Glacier Airport	4.5	4.0	2.3
Water Supply-Col. Falls	7.1	7.0	5.0
Moose City	4.2	2.8	2.3
Kalispell-Strom	8.5	7.5	5.3
Polson	5.0	4.6	2.9
Ronan	10.8	8.1	3.7

*Values in micrograms per cubic meter

TABLE 11

Flathead Basin Air Quality Trends*
Parameter: Sulfates
Site: Kalispell-Strom

Months	Arithmetic Mean	Maximum Reading
October, 1978	3.5	3.9
November	5.8	8.2
December	4.6	5.0
January, 1979	7.6	8.5
February	5.3	6.4
March	4.3	5.1
April	4.6	4.9
May	2.3	2.8

*Values in micrograms per cubic meter

TABLE 12

Flathead Basin Air Quality Trends *
Parameter: Sulfates
Site: Ronan

Months	Arithmetic Mean	Maximum Reading
November, 1978	4.1	6.5
December	3.4	4.1
January, 1979	6.9	10.8
February	4.2	8.1
March	3.9	5.3
April	2.3	3.8
May	1.9	2.6

*Values in micrograms per cubic meter

TABLE 13

Flathead Basin Air Quality Trends*
Parameter: Sulfates
Site: Water Supply-Col. Falls

Months	Arithmetic Mean	Maximum Reading
January, 1978	4.5	9.6
February	6.2	12.8
March	3.1	6.4
April	2.4	3.4
May	2.6	4.5
June	2.3	3.3
July	2.7	4.1
August	3.4	5.2
September	2.9	4.6
October	2.8	5.0
November	3.7	9.1
December	1.9	3.5
January, 1979	5.0	7.1

*Values in micrograms per cubic meter

TABLE 14

Flathead Basin Air Quality Levels*
Parameter: Nitrates
Collection Period: 1978

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Water Supply-Col. Falls	5.6	3.2	0.8
Moose City+	0.6	0.4	0.3
Kalispell-Strom	4.8	3.2	1.6
Ronan	4.2	2.4	1.5

*Values in micrograms per cubic meter
+ Only partial year sampled

TABLE 15

Flathead Basin Air Quality Levels*
Parameter: Nitrates
Collection Period: 1979

Site	Maximum Reading	Second High Reading	Arithmetic Mean
Glacier Airport	5.6	3.5	1.5
Water Supply-Col. Falls	2.9	2.2	1.8
Moose City	1.6	0.3	0.6
Kalispell-Strom	6.6	4.1	2.6
Polson	3.3	2.6	1.5
Ronan	6.6	6.3	2.0

*Values in micrograms per cubic meter

TABLE 16

Flathead Basin Air Quality Trends *
Parameter: Nitrates
Site: Kalispell-Strom

Months	Arithmetic Mean	Maximum Reading
October, 1978	1.0	1.2
November	2.5	4.8
December	1.6	3.2
January, 1979	3.0	4.1
February	3.9	6.6
March	3.1	4.0
April	1.5	1.8
May	1.3	1.3

*Values in micrograms per cubic meter

TABLE 17

Flathead Basin Air Quality Trends *
Parameter: Nitrates
Site: Ronan

Months	Arithmetic Mean	Maximum Reading
November, 1978	2.0	4.2
December	1.0	2.4
January, 1979	3.8	6.3
February	2.5	6.6
March	2.2	4.1
April	0.8	1.5
May	0.9	1.4

*Values in micrograms per cubic meter

TABLE 18

Flathead Basin Air Quality Trends*
Parameter: Nitrates
Site: Water Supply-Col. Falls

Months	Arithmetic Mean	Maximum Reading
January, 1978	2.0	5.6
February	1.1	2.4
March	1.6	2.3
April	0.4	0.6
May	0.5	1.0
June	0.3	0.5
July	0.5	0.8
August	0.5	0.6
September	0.6	0.9
October	0.6	1.0
November	1.3	3.2
December	0.7	1.8
January, 1979	1.8	2.9

*Values in micrograms per cubic meter

TABLE 19

Flathead Basin Air Quality Levels*
Site: Water Supply-Columbia Falls
Collection Period: 1978

Parameter	Maximum Reading	Second High Reading	Aritmetic Mean
Aluminum	1.30	0.66	0.31
Arsenic	0.003	0.002	0.002
Cadmium	0.124	0.004	0.016
Chromium+	0.105	0.105	0.105
Copper	0.07	0 04	0.03
Iron	0.70	0.56	0.22
Lead	0.25	0.17	0.07
Manganese	0.23	0.04	0.04
Nickel	0.195	0.080	0.061
Vanadium+	0.13	0.13	0.13
Zinc	0.13	0.04	0.03
Nitrate	5.6	3.2	0.8
Sulfate	12.8	9.7	3.2
Total Suspended Particulates	59	56	25

*Values in micrograms per cubic meter
+Only one sample taken

III. METEOROLOGY

A. Surface Wind

Surface wind data were collected at six sites in the Flathead River Basin. Data from January 1978 through June 1979 are considered in this report.

The Brant site, located in a field about 200 yards south of Glacier Park International Airport, was operated from March through May 1978. The most common wind direction was from the south during all three months, with a secondary maximum of wind frequency from the north through north-northeast during March and April. The least common wind direction was east-northeast through east-southeast during all three months. Average wind speeds were light, ranging from 0.5 to 2.5 meters/sec. The strongest winds were generally from the north through north-northeast, while lightest winds were generally from the east. Calm conditions were uncommon, occurring from 0.9 to 3.7 percent of the time.

In June 1978 the Brant site was moved to the current Airport site, which is located adjacent to the parking lot at Glacier Park International Airport. Data have been collected at this site since that time. The most common wind direction at this site was south-southeast or south during all months except November 1978 and March 1979, when north-northeast was most common, and January 1979, when the prevailing wind was from the north. A secondary maximum of wind frequency was noted during all months except September 1978. This secondary maximum was from the north through north-northeast during most months, except for November 1978 and March 1979, when it was south-southeast, and January and May 1979, when it was from the southwest. The least common wind

directions during all months were east-northeast through east-southeast. Average wind speeds ranged from 0.5 to 6.5 meters/sec and were strongest from the south except for the months November through March, when winds from the north-northeast were strongest. The lowest average wind speeds were from the east during all months. Calm conditions were observed only in April (0.8%) and June 1979 (0.1%).

Data collected by the National Weather Service (NWS) at Glacier Park International Airport for the months May 1978 through February 1979 have been included in this report. Caution should be exercised when comparing these data with that from wind sites operated by the Air Quality Bureau because the NWS data consist of instantaneous observations of wind direction and speed taken once every three hours, while the air quality data are hourly means. In addition, the wind speed indicator used by the National Weather Service records as zero any wind speed less than 1.5 mph. Generally, the distribution of wind directions agrees very closely to that recorded at the Air Quality Bureau's airport site, but calm conditions were noted much more frequently by the National Weather Service. These calm conditions, almost without exception, occurred during the nighttime and early morning hours.

The Teakettle Mountain site is located about two miles north of Columbia Falls, and about one mile north of the Anaconda Aluminum Company. Data have been recovered there from January 1978 through June 1979. This site is located in a small side valley that drains into the Flathead Valley. It shows a significant diurnal mountain valley wind system that is most notable in the spring and least apparent in the winter. During the nighttime the winds blew down the valley from the northwest to the north (41 percent annually) at an average annual velocity of 2.1 m/sec. During the daylight hours, generally starting several hours after sunrise, the winds blew up the valley from the

south-southeast through the southwest (27 percent annually) at an average annual velocity of 2.6 m/sec. This event is most dramatic in the spring when the wind speeds are greatest and the directional wind shift most distinct.

The prevailing wind at this site was from the northwest through north during all months except January 1979 (west-southwest) and February 1979 (south). A secondary maximum of wind frequency was observed from the south-southeast through south-southwest during all months except February and April 1978 and January 1979, when it was from the east, and February 1979 when it was from the north. The least common wind direction was east-southeast through south-southeast except for August through October 1978, when northeast through east-northeast were least common, and January through April plus June 1979, when winds from the south-southwest through west-southwest were least common. Average wind speeds here were higher than those at other sites in the area, ranging from about one to twelve meters/sec, and averaging three to five meters/sec. The highest average wind speeds were from the east, and the lowest were usually from the southwest through northwest. Calm conditions were observed less than 2 percent of the time, except during June 1978 when they occurred 5.8 percent of the time.

The Polebridge site was located at the Polebridge Ranger Station just inside Glacier National Park. It was in operation only from September 1978 through November 1978. This site showed a bimodal wind direction frequency. The wind blew from the north-northeast to northeast 33 percent of the time at a light velocity of 0.5 meters/sec. This was probably a nocturnal drainage wind down the valley. The other maximum occurred between the south-southwest and west-southwest. The wind blew from this direction 32 percent of the time at an average speed of 1.5 m/sec. The least common wind direction was from the east-southeast through the south-southeast from where the wind blew less than one percent of the time. Calm conditions were noted here about two percent of

of the time. It was found that the Ranger Station proved to be a poor site location, as it was too close to the main channel of the North Fork of the Flathead River to give a fair distribution of wind directions. The main channel of the river ran on a line southwest from the site, thus accounting for the wind direction maximum from the southwest quadrant. There also proved to be too many tall trees and buildings in the vicinity of the instrument. Strong winds were dampened which resulted in the generally light winds recorded at this site.

The Polebridge site was moved two miles north to Big Prairie in November 1978. The recorder was in operation here for one month, but had to be shut down in December 1978 due to severe winter weather and was not re-started until May 1979. The Big Prairie location showed wind patterns that were similar to the Ranger Station except that the wind speeds were greater. The primary maximum occurred from the north through the northeast direction. The wind blew from these directions 55 percent of the time at a velocity of about 1 m/sec. This was probably a nocturnal drainage wind down the valley. The secondary maximum was from the south to southwest (23 percent) at a velocity of 2.7 m/sec, except in May 1979 when the secondary maximum was from the southeast. Another significant wind direction was west-northwest through north-northwest (11 percent) at a velocity of 2.5 m/sec. The least common wind direction was east-southeast to south-southeast (4 percent) at a velocity of about one m/sec. Calm conditions were not observed here in November and December 1978, but occurred 8.8 percent of the time in May 1979 and 6.2 percent of the time in June 1979.

The Geis site was located two miles south of Columbia Falls, a short distance to the east of Highway 35. Data used for this report cover the period from January 1978 through May 1978. The prevailing wind here was from

the north in January and February and from the south in March, April and May. A secondary maximum of wind frequency was noted from the south during January and February and from the north during March, April and May. Average wind speeds varied from about 1 to 5 meters/sec, with the highest speeds from the south, and the lowest from the east. Calm conditions were never observed here.

The Polson site is located about one mile east of the city of Polson close to the intersection of Highway 93 and Highway 35. Data collection began there in October 1978 and has continued to the present. The prevailing wind at this site was from the south or south-southeast during all months except April 1979, when it was from the north. A secondary maximum from the north-northwest through north-northeast was observed during all months except April 1979, when it was from the south. The least common wind direction was east-southeast or east-northeast during all months except March, when it was southwest. Average wind speeds were low, ranging from about 0.5 to 4 meters/sec. The highest average speeds were from the south, and the lowest were usually from the east. Calm conditions occurred from 0 to 5 percent of the time.

Although each of these wind sites are separated by considerable distances, all of them show similar distributions of wind directions. Basically, two maxima occur, one from the north and the other from the south. The primary reason for this is that the axis of each of the valleys in which the sites are located in runs basically on a north-south line. The least common winds were from the east through the southeast. Probably the steep mountain barriers that form the eastern boundary for each of these valleys influences this. Wind directions from the southwest through the northwest are generally evenly distributed.

Strong northeast winds are indicated at both the Airport site and at Tea-

kettle Mountain site. These winds can sometimes be very strong averaging as much as 17 m/sec. This type of wind does not seem to be as significant in the Polebridge and Polson areas.

It would appear that Flathead Lake affects the winds at both the Airport location and at Polson. Gusty winds from the south are noticeable during the afternoon hours at the airport. They average between 2.5 to 3.0 m/sec but sometimes they can be as high as 9.0 meters per second. This phenomenon begins in late March and continues through September. The Polson data presented in this report covers the autumn and winter months. The Flathead Lake would tend to be a warm surface at this time of year and should act as a drain for surface winds. This is substantiated somewhat by the dominant wind direction from the south as observed here.

B. Upper Air

Pilot balloons with temperature sondes attached were launched from the airport site six times per week (Monday, Wednesday and Friday at one-half hour after sunrise and at 1400 MST). Monthly summaries of surface and upper level winds were prepared and are included in the appendix of this report. The data available are from the period June 1978 through June 1979.

An analysis of the morning wind summaries indicates that morning surface winds are generally from the north-northwest through north during the summer and autumn months, and from the southeast through south-southeast during the winter and spring months. The only exceptions to this pattern occurred in January 1979, when prevailing surface winds were from the north, and June 1979, when the prevailing winds were from the west-northwest. Prevailing wind directions at 100 and 200 meters above ground level were generally very similar to those observed at the surface. At 200 or 300 meters, the prevailing wind

direction shifted to the southeast through south-southwest during most months and remained nearly constant up to 2000 meters.

During the afternoon soundings the prevailing surface wind direction was southeast through south during nearly all months. The only exceptions were September 1978, when the prevailing winds were from the west-southwest, and December 1978, when the prevailing winds were from the northeast. Wind directions up to 500 meters above ground level were similar to those observed at the surface. Above 500 meters the wind tended to veer with height, usually becoming west-southwest through west at 1500 meters and generally west through northwest at 2000 meters. Above 1000 meters above ground level, morning and afternoon wind directions were very similar.

Average surface wind speeds during the morning soundings were light, ranging from 1.0 meters/sec in June 1978 to 3.4 meters/sec in December 1978, and averaging about 2 meters/sec. Wind speeds increased sharply with height, becoming two to three times greater at 100 meters than at the surface. Above 100 meters the wind speed generally increased slowly with height, typically becoming 1.5 to 2 times greater at 1500 meters than at 100 meters. A seasonal trend in wind speeds was apparent, with greatest winds at all levels occurring in the winter months and lightest wind speeds occurring during the summer months.

Average surface wind speeds during the afternoons were generally two to three times greater than those in the mornings, averaging from 1.0 to 5.0 meters/sec. A seasonal trend was apparent here too, with the greatest average wind speeds occurring in the autumn and spring months and the lightest winds occurring during the summer and winter. Average wind speeds increased with height, typically becoming about twice as strong at 500 meters as at the surface. Above 500 meters, average morning and afternoon wind speeds were very similar.

From the temperature sonde traces, monthly summaries of inversion base height, thickness, and Holzworth classification were prepared. In the Holzworth scheme, inversions are classified from 1 to 5 according to their strength, with 1 being the weakest and 5 the strongest (Table 20).

An analysis of the morning inversion summaries indicates that the most common inversion base height was the surface during all months except January 1979, when base heights between 1001 and 1500 meters were most common. The most common thickness of these surface based inversions was 101-250 meters during most months, except for the winter months, when a thickness of 1-100 meters was most common. The most common thickness of elevated inversions was from 1-100 meters during most months, with a few scattered months having thicknesses of 101-250 meters the most common. The most common Holzworth classification of surface-based inversions was 3 for most months, with the most significant exceptions being in October, November and December 1978, when type 4 inversions were most common. Elevated inversions were generally weaker than surface based ones, with types 2 and 3 being the most common. No seasonal variation was apparent in the strengths of elevated inversions.

The most common inversion base height during the afternoon soundings was from 1001-1500 meters or 1501-2000 meters during most months. The most significant exceptions occurred in December 1978 when bases of 1-100 meters were most common, and February 1979, when surface-based inversions were most common. Surface based inversions did not occur at all except during January and February 1979, and only in February were they common. The most frequently observed thickness of surface-based inversions was 101-250 meters. The two most common thickness of elevated inversions were 1-100 meters and 101-250 meters during all months, with no obvious seasonal variation in thickness apparent. The most common Holzworth classification for surface-based inversions

was 1 in both January and February 1979. The most common Holzworth classification for elevated inversions was 3 during the winter months and generally 1 or 2 during the other months.

Monthly summaries of mixing height, average wind speed through the mixed layer and average lapse rate below the first inversion were prepared and are included in the appendix of this report. An examination of the mixing height summaries indicates that the most common morning mixing height was from 0 to 100 meters during all months except January and February 1979, when it was 251 to 500 meters and March 1979, when mixing heights of 101-250 meters were most common. The afternoon mixing heights also showed a seasonal pattern, with mixing heights greater than 1500 meters being most common during most months, except for December 1978 through February 1979, when mixing heights of 101 to 250 meters were most common and March 1979, when mixing heights of 501 to 750 meters were most frequent.

The distribution of mixing heights has important implications for air quality since it indicates that dispersion would be seriously inhibited during the winter when mixing heights tend to remain low throughout the day.

The average wind speed through the mixed layer in the mornigns ranged from 2.2 meters/sec in June 1979 to 6.2 meters in September 1978, and averaged about 4 meters/sec. Highest values were noted in the autumn and spring, and lowest values occurred in the summer. During the afternoon soundings, the average wind speed through the mixed layer ranged from 4.2 meters/sec in March 1979 to 8.0 meters/sec in September 1978, and averaged about 5 meters/sec. No obvious seasonal variation was apparent.

The average lapse rate below the first inversion during the morning soundings varied from -0.66 deg C/100 m in August 1978 to -1.62 deg C/100 m in July 1978, and averaged about -1.0 deg C/100 m. During the afternoon

soundings, the average lapse rate below the first inversion ranged from -0.41 deg C/100 m in February 1979 to -2.59 deg C/100 m in July 1978, and averaged about -1.4 deg C/100 m. No seasonal trend was apparent in the morning soundings; however, during the afternoon soundings the winter months appeared to have a lower average lapse rate than did other months.

Average monthly temperature traces showing the average variation in temperature from the surface to 1800 meters above ground level were prepared from the individual pilot balloon runs, and are included in the appendix of this report. These were performed to determine graphically a value for the average monthly morning and afternoon mixing heights. One problem in determining average monthly mixing heights has been the uncertainty of how to handle cases of unlimited mixing heights, e.g., cases where the dry adiabat does not intersect the temperature trace. The graphical method used was to plot average temperature versus height, and then to draw a dry adiabat beginning at the surface at a temperature 3 degrees C warmer than the surface temperature for morning traces, or 2 degrees C warmer for afternoon runs. The height at which the dry adiabat intersects the temperature trace is the mixing height. Values of morning and afternoon mixing heights derived in this manner appear in this report (Table 21).

An examination of this table indicates that average morning mixing heights were generally less than 100 meters, except for December 1978 and February 1979, which had average mixing heights of 815 and 315 meters, respectively. A seasonal variation in mixing heights is apparent, with higher values occurring during the winter and lower values occurring in the late summer and early autumn. During the afternoons, average mixing heights were generally greater than 100 meters, except for the winter months, when average mixing heights were from 200 to 500 meters. Based on these figures, dispersion of pollutants is

likely to be most inhibited during the winter, when mixing heights tend to remain low throughout the day.

C. Acoustic Radar

An acoustic radar has been operated at the Kalispell airport site since late 1976. Data from January 1978 through March 1979 are included in this report. Two major losses of data, in June and September 1978, occurred due to power surges.

The monostatic acoustic sounder (or acoustic radar) manufactured by AeroEnvironment, Inc. consists of a transmit/receive dish antenna approximately four feet in diameter and a recording/display unit which produces a permanent chart record. Approximately every 22 seconds the antenna emits a 1600 Hz sound pulse. The pulse is directed vertically upward and is reflected downward to the receiver if stable layers or inversions are present, by small-scale turbulence and temperature discontinuities associated with inversions. The echoes received are recorded electrically on heat-sensitive chart paper. The chart produced is interpreted by the operator, who obtains from it a stability estimate (stable, unstable, or neutral) of the lowest 100 meters of the atmosphere, and the height, thickness, and type of any inversion(s) present. These data are further analyzed by computer, and monthly summaries of first (lowest) and second (second lowest if multiple inversions are present) inversions are produced. A two-hour stability analysis is also performed, which assigns data into one of six stability categories, A through F, where A is the most unstable and F is the most stable. These classifications are based on the operator's stability estimate plus wind speed, time of day, solar altitude angle, and cloud conditions. A more complete discussion of the procedure followed can be found in a report recently published by the Air Quality Bureau (Gelhaus, 1979).

An examination of the monthly first inversion summaries (Table 22) shows that during the nighttime hours (000-0600 MST), the ground surface was most common inversion base during all months. The most common inversion thickness during this time period was from 101 to 300 meters during all months except March 1979, when a thickness of 1 to 100 meters was most common. During the morning hours (0600-1200 MST), the ground surface was the most common base height during most months. The only exceptions were April 1978, when a base height of 200 meters was most common, and July and August 1978, when 300 meters was the most common base height. The most frequent inversion thickness was 101 to 300 meters during most months, the only exceptions occurring in February 1978 and January 1979, when the most common thickness was 301 to 500 meters, and in April, May, July and August 1978, when 1 to 100 meters was the most common thickness. A seasonal pattern is apparent here, with inversions tending to be thinner during the spring and summer than during other seasons. In the afternoons (1200-1800 MST) the most common base height was the surface during January through March 1978 and from November 1978 through February 1979. During the other months, the most common base height was 200 or 300 meters. The most common inversion thickness was from 101 to 300 meters during January through March 1978 and November 1978 through February 1979, and 1 to 100 meters during other months. In the evening hours (1800-2400 MST), the most common base height was the surface during all months. The most common inversion thickness was 101 to 300 meters during all months except July and August 1978, when 1 to 100 meters was most common.

An examination of the second inversion monthly summaries (Table 23) indicates that during the nighttime hours, the most common base height was 300 meters during all months except October 1978 and Feburary 1979, when 400 meters was most common. The most common inversion thickness was 1 to 100 meters during

all months. During the morning hours, the most common base height was 300 or 400 meters during all months except December 1978, when 200 meters was most common. The most common inversion thickness was 1-100 meters during all months. In the afternoons, the most common base height was either 300 or 400 meters during all months, and the most common thickness was 1 to 100 meters during all months. During the evenings, the most common base height was 300 or 400 meters during nearly all months, and the most common thickness was 1-100 meters during all months.

A table of percent frequency of occurrence of periods with inversion(s) present (Table 24) is included with this report. This table shows that during the nighttime hours an inversion is present from 85 to 100 percent of the time during most months. November 1978, with inversions present 66.7 percent of the time, was the most significant exception. A seasonal trend was not readily apparent, although the months of November through January appear to have fewer inversions present than other months. The percentage of occurrence of second inversions was much lower, averaging about 10 percent and ranging up to 22.6 percent in January 1979. No definite seasonal trend was apparent.

During the morning hours, a first inversion was present from 32.1 percent of the time in August 1978 to 100.0 percent of the time in February 1978, with an average value of about 80 percent during most months. A seasonal trend is apparent, with inversions more common during the wintertime than in other seasons. This is at least partly due to the longer nights in winter, but is also due to the presence of a semi-permanent inversion in this area during the winter. Second inversions were less common, with none at all occurring in February, March, April and July 1978. October 1978 had the greatest occurrence of second inversions, at 15.8 percent. Second inversions appeared to be more common during the autumn and winter months than at other times.

During the afternoon hours, a definite seasonal variation in frequency of inversion occurrence was apparent, with inversions being present most of the time between November and March, but rarely during the summer months. Spring and autumn months were intermediate in inversion frequency. Second inversions were very uncommon during this time period, only being noted during February and November 1978, and January and February 1979. Even in the months they did occur, the frequency of occurrence was less than ten percent.

In the evening hours inversions were present most or all of the time during all months, with no seasonal trends being apparent. Second inversions were much less common, and were not observed at all during the spring months, but occurred from 10 to 23 percent of the time during the winter months.

Tables of percent frequency of occurrence of stability classifications for the four six-hour periods as well as for the 24-hour period were prepared and are included with this report (Tables 25-29). Considering the period 0000-2400 MST, these tables indicate that category D,neutral, was the most common during all months except January through April 1978, when category E, slightly stable, was most common and October 1978, when category F, moderately stable, was most common. Category A, very unstable, was the most uncommon category, occurring less than one percent of the time in May and July 1978, and not at all during other months. A seasonal pattern was evident in the distribution, with the more unstable categories occurring more frequently in the spring, summer, and autumn months, while during the winter months the more stable categories were more commonly observed.

During the nighttime hours (0000-0600 MST), the most common category was category E during January through May 1978, category F during July, August and October, and category D from November 1978 through March 1979. A seasonal pattern was evident, with the summer and autumn months experiencing the most

stable conditions during this time period. No unstable category was ever observed during this time period.

In the mornings (0600-1200 MST), category D was most common during all months, except July 1978, when category C, slightly unstable, was most common, and August 1978, when categories C and D were equally common. A seasonal variation was again apparent, with the stable categories much more common in the winter than at other times of the year.

During the afternoons (1200-1800 MST), category D was most common except for March, April, July, August, and October 1978, when category C was most common. This time period, as would be expected, had a greater frequency of unstable conditions than any other. During the winter however, stable categoires were quite common, due to the semi-permanent inversion present over this area during that season. Although unstable categories, taken as a whole, were most common during the summer it is interesting to note that category B, moderately unstable, occurred most often in March and November 1978.

The evening (1800-2400 MST) frequency distribution resembled closely the nighttime pattern, with category E being most common during all months except May and August 1978, and February through March 1979, when category D was most common and October 1978, when category F was most common. The winter months showed the greatest incidence of stable categories, although the most stable category, F, occurred most frequently during the summer. Unstable categories were seldom noted, with category C occurring less than 4 percent of the time in April, May, July, and December 1978, and not at all during other months. Categories A and B were never observed.

The acoustic radar data indicate that the Kalispell area is subject to stable conditions nearly every night of the year, and that stability is likely to be greatest during summertime nights. During all months except November

through March, the nighttime inversion generally disappears within two to three hours after sunrise, during which times fumigation episodes could occur. Except for fumigation episodes, the highest concentrations of pollutants are likely to occur during November through March, when the presence of a semi-permanent inversion will hinder dispersion.

TABLE 20

Holzworth Lapse Rate Categories (Modified)
Values in deg C/100m

Non-Inversion Class	Lapse Rate	Description
1	$\leq$ -1.60	Very Superadiabatic
2	-1.21 to -1.60	Superadiabatic
3	-0.81 to -1.20	Near Dry Adiabatic
4	-0.41 to -0.80	Near Standard Atmosphere
5	0.00 to -0.40	Weak Lapse

Inversion Class	Lapse Rate	Description
1	0.00 to +0.47	Weak Inversion
2	+0.48 to +1.14	Moderate Inversion
3	+1.15 to +2.82	Strong Inversion
4	+2.83 to +6.00	Very Strong Inversion
5	$\geq$ +6.00	Extreme Inversion

(Holzworth, 1974)

TABLE 21

Average Morning and Afternoon Mixing Heights (meters), From Average Monthly Temperature Traces-Airport Site

Kalispell, Montana

	Month	Morning	Afternoon
1978	Jul	135	1300
	Aug	75	>1800
	Sep	100	>1800
	Oct	50	1420
	Nov	135	>1200
	Dec	815	515
1979	Jan	115	195
	Feb	315	200
	Mar	95	980
	Apr	150	>900
	May	90	1500
	Jun	85	>1500

TABLE 22

Kalispell Airport Site

Most Common First Inversion BAse Height and Thickness
by Time and Month, From Acoustic Radar

Month	0001-0600 MST		0601-1200 MST		1201-1800 MST		1801-2400 MST	
	Base	Thickness	Base	Thickness	Base	Thickness	Base	Thickness
1978 Jan	sfc	101-300	sfc	101-300	sfc	101-300	sfc	101-300
Feb	sfc	101-300	sfc	301-500	sfc	101-300	sfc	101-300
Mar	sfc	010-300	sfc	101-300	sfc	101-300	sfc	101-300
Apr	sfc	101-300	200	1-100	200	1-100	sfc	101-300
May	sfc	101-300	sfc	1-100	300			
Jun								
Jul	sfc	101-300	300	1-100	300	1-100	sfc	1-100
Aug	sfc	101-300	300	1-100	-	-	sfc	1-100
Sep								
Oct	sfc	101-300	sfc	101-300	300	1-100	sfc	101-300
Nov	sfc	101-300	sfc	101-300	sfc	101-300	sfc	101-300
Dec	sfc	101-300	sfc	101-300	sfc	101-300	sfc	101-300
1979 Jan	sfc	101-300	sfc	301-500	sfc	101-300	sfc	101-300
Feb	sfc	101-300	sfc	101-300	sfc	101-300	sfc	101-300
Mar	sfc	1-100	sfc	101-300	300	1-100	sfc	101-300

TABLE 23

Kalispell Airport Site

Most Common Second Inversion Base Height and Thickness
by Time and Month, From Acoustic Radar

Month	0001-0600 MST		0601-1200 MST		1201-1800 MST		1801-2400 MST	
	Base	Thickness	Base	Thickness	Base	Thickness	Base	Thicknes
1978 Jan	300	1-100	400	1-100	-	-	300	1-100
Feb	300	1-100	-	-	400	1-100	400	1-100
Mar	300	1-100	-	-	-	-	300	1-100
Apr	300	1-100	-	-	-	-	-	-
May	300	1-100	400	1-100	-	-	-	-
Jun								
Jul	300	1-100	-	-	-	-	-	-
Aug	300	1-100	300	1-100	-	-	200	1-100
Sep								
Oct	400	1-100	400	1-100	-	-	400	1-100
Nov	300	1-100	300	1-100	300	1-100	400	1-100
Dec	300	1-100	200	1-100	-	-	300	1-100
1979 Jan	300	1-100	300	1-100	400	1-100	400	1-100
Feb	400	1-100	300	1-100	400	1-100	300	1-100
Mar	300	1-100	300	1-100	-	-	-	-

TABLE 24

Kalispell Airport Site

Percent Frequency of Occurrence of Periods with Inversion(s) Present from Acoustic Radar

Month	0001-0600 MST First Inversion	0001-0600 MST Second Inversion	0601-1200 MST First Inversion	0601-1200 MST Second Inversion	1201-1800 MST First Inversion	1201-1800 MST Second Inversion	1801-2400 MST First Inversion	1801-2400 MST Second Inversion
1978 Jan	92.6	7.4	85.2	3.7	75.0	0.0	92.9	7.1
Feb	96.4	3.6	100.0	0.0	46.4	3.6	85.7	14.3
Mar	100.0	6.5	90.3	0.0	25.8	0.0	93.5	6.5
Apr	100.0	10.0	80.0	0.0	14.3	0.0	100.0	0.0
May	94.7	10.5	68.4	5.3	10.0	0.0	80.0	0.0
Jun								
Jul	95.8	12.5	79.2	0.0	7.7	0.0	100.0	0.0
Aug	96.4	10.7	32.1	3.6	0.0	0.0	81.5	7.4
Sep								
Oct	94.7	10.5	78.9	15.8	25.0	0.0	100.0	20.0
Nov	66.7	13.3	60.0	10.0	66.7	6.7	86.7	16.7
Dec	87.1	9.7	80.6	6.5	58.1	0.0	93.5	9.7
1979 Jan	83.9	22.6	83.9	16.1	77.4	9.7	87.1	22.6
Feb	92.3	7.7	92.3	15.4	76.9	7.7	92.3	15.4
Mar	100.0	12.5	62.5	12.5	88.9	0.0	66.7	0.0

TABLE 25

Kalispell Airport Site

Percent Frequency of Occurrence of Stability Classifications
0000-2400 MST

Month	Category A	B	C	D	E	F	U	M
1978 Jan	0.0	0.0	1.9	34.1	48.1	4.6	0.0	11.3
Feb	0.0	1.2	6.8	28.9	57.4	5.7	0.0	0.0
Mar	0.0	4.0	14.5	22.8	45.4	13.2	0.0	0.0
Apr	0.0	0.6	16.7	19.4	21.4	9.2	1.1	31.7
May	0.5	1.1	7.8	29.8	16.9	5.4	1.1	37.4
Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Jul	0.3	2.4	21.5	23.7	11.3	18.8	0.8	21.2
Aug	0.0	1.3	21.8	32.8	14.5	17.7	0.8	11.0
Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Oct	0.0	3.2	9.4	16.7	15.6	17.7	0.3	37.1
Nov	0.0	3.3	5.3	52.5	29.2	9.7	0.0	0.0
Dec	0.0	1.1	1.9	58.1	28.5	10.5	0.0	0.0
1979 Jan	0.0	0.3	0.0	50.8	28.2	16.1	0.0	4.6
Feb	0.0	0.0	0.0	32.4	10.7	3.0	0.0	53.9
Mar	0.0	0.0	2.2	20.4	3.8	0.3	0.0	73.4

A very unstable
B moderately unstable
C slightly unstable
D neutral
E slightly stable
F moderately stable
U unknown
M missing

TABLE 26
Kalispell Airport Site

Percent Frequency of Occurrence of Stability Classifications
0000-0600 MST

Month		Category A	B	C	D	E	F	U	M
1978	Jan	0.0	0.0	0.0	30.1	49.5	7.5	0.0	12.9
	Feb	0.0	0.0	0.0	15.5	77.4	7.1	0.0	0.0
	Mar	0.0	0.0	0.0	11.8	65.6	22.6	0.0	0.0
	Apr	0.0	0.0	0.0	15.6	35.6	15.6	0.0	33.3
	May	0.0	0.0	0.0	17.2	30.1	14.0	0.0	38.7
	Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Jul	0.0	0.0	0.0	15.1	14.0	48.4	0.0	22.6
	Aug	0.0	0.0	0.0	18.3	30.1	41.9	0.0	9.7
	Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Oct	0.0	0.0	0.0	8.6	24.7	28.0	0.0	38.7
	Nov	0.0	0.0	0.0	45.6	35.6	18.9	0.0	0.0
	Dec	0.0	0.0	0.0	53.8	32.3	14.0	0.0	0.0
1979	Jan	0.0	0.0	0.0	49.5	29.0	18.3	0.0	3.2
	Feb	0.0	0.0	0.0	35.7	7.1	3.6	0.0	53.6
	Mar	0.0	0.0	0.0	18.3	6.5	1.1	0.0	74.2

A very unstable
B moderately unstable
C slightly unstable
D neutral
E slightly stable
F moderately stable
U unknown
M missing

TABLE 27

Kalispell Airport Site
Percent Frequency of Occurrence of Stability Classifications
0600-1200 MST

Month	Category A	B	C	D	E	F	U	M
1978 Jan	0.0	0.0	1.1	41.9	39.8	4.3	0.0	12.9
Feb	0.0	1.2	7.1	27.4	61.9	2.4	0.0	0.0
Mar	0.0	8.6	20.4	34.4	33.3	3.2	0.0	0.0
Apr	0.0	0.0	20.0	26.7	13.3	4.4	2.2	33.3
May	2.2	0.0	7.5	39.8	8.6	1.1	2.2	38.7
Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Jul	1.1	7.5	37.6	28.0	2.2	0.0	1.1	22.6
Aug	0.0	4.3	40.9	40.9	2.2	1.1	1.1	9.7
Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Oct	0.0	11.8	7.5	28.0	8.6	5.4	0.0	38.7
Nov	0.0	4.4	8.9	68.9	13.3	4.4	0.0	0.0
Dec	0.0	0.0	0.0	67.7	25.8	6.5	0.0	0.0
1979 Jan	0.0	0.0	0.0	59.1	28.0	11.8	0.0	1.1
Feb	0.0	0.0	0.0	33.3	10.7	2.4	0.0	53.6
Mar	0.0	0.0	2.2	21.5	2.2	0.0	0.0	74.2

A very unstable
B moderately unstable
C slightly unstable
D neutral
E slightly stable
F moderately stable
U unknown
M missing

TABLE 28

Kalispell Airport Site
Percent Frequency of Occurrence of Stability Classifications
1200-1800 MST

Month		Category A	B	C	D	E	F	U	M
1978	Jan	0.0	0.0	5.4	41.9	39.8	3.2	0.0	9.7
	Feb	0.0	3.6	20.2	42.9	33.3	0.0	0.0	0.0
	Mar	0.0	7.5	37.6	33.3	21.5	0.0	0.0	0.0
	Apr	0.0	2.2	45.6	20.0	1.1	0.0	0.0	0.0
	May	0.0	4.3	21.5	34.4	2.2	0.0	1.1	36.6
	Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Jul	0.0	2.2	47.3	28.0	1.1	0.0	1.1	20.4
	Aug	0.0	1.1	46.2	37.6	2.2	0.0	1.1	11.8
	Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Oct	0.0	1.1	31.2	25.8	5.4	0.0	1.1	35.5
	Nov	0.0	8.9	14.4	57.8	17.8	1.1	0.0	0.0
	Dec	0.0	5.4	11.8	65.6	14.0	3.2	0.0	0.0
1979	Jan	0.0	1.1	0.0	59.1	19.4	12.9	0.0	7.5
	Feb	0.0	0.0	0.0	33.3	10.7	2.4	0.0	53.6
	Mar	0.0	0.0	6.5	20.4	0.0	0.0	0.0	73.1

A very unstable
B moderately unstable
C slightly unstable
D neutral
E slightly stable
F moderately stable
U unknown
M missing

TABLE 29

Kalispell Airport Site
Percent Frequency of Occurrence of Stability Classifications
1800-2400 MST

Month		Category A	B	C	D	E	F	U	M
1978	Jan	0.0	0.0	0.0	23.7	63.4	3.2	0.0	9.7
	Feb	0.0	0.0	0.0	29.8	57.1	13.1	0.0	0.0
	Mar	0.0	0.0	0.0	11.8	61.3	26.9	0.0	0.0
	Apr	0.0	0.0	1.1	15.6	35.6	16.7	1.1	30.0
	May	0.0	0.0	2.2	28.0	26.9	6.5	1.1	35.5
	Jun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Jul	0.0	0.0	3.2	21.5	28.0	26.9	1.1	19.4
	Aug	0.0	0.0	0.0	34.4	23.7	28.0	1.1	12.9
	Sep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Oct	0.0	0.0	0.0	3.2	23.7	37.6	0.0	35.5
	Nov	0.0	0.0	0.0	35.6	50.0	14.4	0.0	0.0
	Dec	0.0	0.0	1.1	39.8	40.9	18.3	0.0	0.0
1979	Jan	0.0	0.0	0.0	35.5	36.6	21.5	0.0	6.5
	Feb	0.0	0.0	0.0	27.4	14.3	3.6	0.0	54.8
	Mar	0.0	0.0	0.0	21.5	6.5	0.0	0.0	72.0

A very unstable
B moderately unstable
C slightly unstable
D neutral
E slightly stable
F moderately stable
U unknown
M missing

IV. VISIBILITY

Visibility related measurements were taken in the Flathead Basin using a variety of measurement techniques. During the first year of the study (June 1978 - June 1979) three methods of visibility assessment were used. These were a five channel sun photometer (440 nm*, 500 nm, 640 nm, 880 nm and 940 nm), a diffuse radiation system (300 to 2800 nm and 300 to 700 nm pyranometers and pyrheliometers), and an integrating nephelometer. Measurements of meteorological and air quality variables also were made during the same time period.

Electromagnetic radiation from the sun has approximately the spectral content of a black body with temperature near 5900 K. Superimposed thereon are atomic and molecular emissions and absorption. The majority (98%) of the solar spectral irradiance lies between 294 and 4000 nm. The most important spectral region is from 300 to 4000 nm for solar-thermal conversion systems and from 400 to 1100 nm for photovoltaic conversion.

The spectral energy density of the sun's radiation is nearly constant and is assumed as constant for this study. The principal effects at ground level are due to the rotation of the earth, the properties of the atmosphere, and to a much less extent, the earth-sun distance.

Scattering by air molecules (Rayleigh scattering) has a sizeable effect on the intensity of the direct solar irradiation at the shorter visible and ultraviolet wave lengths. The scattering coefficient is approximately proportional to the inverse fourth power of the wavelength. In the ultraviolet and the longer visible and infrared wavelengths, absorption by

* nm = nanometer = 10^{-9} meters

atmospheric gases is important.

Of the gases occurring naturally, the greatest effect on solar radiation is due to water vapor and ozone. Carbon dioxide, methane, nitrogen dioxide, and oxygen also play a role, but a relatively minor one in the normal atmosphere. However, man-made gaseous pollution and volcanic gases may result in significant absorption locally.

Let I_λ be the irradiance at wavelength λ at some observing point and I'_λ the irradiance at wavelength λ at some nearby observing point further from the sun; Δx and σ will represent the separation between these two points and the extinction per unit length, respectively. If the distance between the two points becomes infinitesimal, then the relation is written:

$$- d\, I_\lambda = I_\lambda \sigma\, dx$$

The incremental extinction σdx may be rewritten $\sigma_m dM_h$ in terms of relative optical air mass M_h and the extinction per unit optical air mass σm. The relative optical air mass M_h is the amount of optical atmosphere between the sun and the observing point divided by the amount of optical atmosphere vertically above the observing point.

Extinction of sunlight is primarily due to ozone and water vapor absorption, and aerosol and molecular scattering. Expressed mathematically,

$$\sigma_m = B_\lambda + b_\lambda + k_\lambda$$

where B_λ , b_λ and k_λ are the aerosol scattering or turbidity coefficients as a function of wavelength per unit optical air mass, Rayleigh scattering of air molecules per unit optical air mass, and absorption by the ozone layer or water vapor per unit optical air mass, respectively. Incorporating this relation:

$$- d\, I_\lambda / I_\lambda = (B_\lambda + b_\lambda + k_\lambda)\, dM_h$$

Integrating this relation from the earth's surface to the top of the atmosphere we obtain:

$$I_\lambda = (I_o / S)e \quad (B_{o\lambda} + b_\lambda + k_\lambda) M_h \quad \text{Malm(1977).}$$

where $I_{o\lambda}$ is the extraterrestrial irradiance of wavelength λ at the mean sun-earth distance. Because most of the ozone of the atmosphere is above the observing point, regardless of its elevation above sea level, no height or pressure correction is necessary for k_λ specifically for ozone. Background atmospheric aerosol concentrations depend on altitude. However, often local aerosol contributions (aerosol due to wind blown dust, pollutants from stationary and mobile sources, etc.) tend to dominate the turbidity coefficient and B_λ is consequently usually assumed to be altitude independent. The attenuation due to Rayleigh scattering could have been corrected for altitude by multiplying by the ratio of p/p_o where p is the station pressure and p_o is the standard pressure at sea level. However, the correction used here was to take values from Elterman (1968) for the elevation of the Glacier International Airport site (904 meters above sea level) and the William Campbell residence (915 meters above sea level).*

Many previous studies of solar radiation scattering have used either the base e or the base 10 equation from Malm. The equation can be changed from the natural logarithm to the base 10 logarithm. The basic equation then becomes:

$$I_\lambda = (I_{o\lambda}/S)\ 10 \exp\ (B_\lambda + k_\lambda + b_\lambda)\ M_h$$

Solving this equation for the turbidity coefficient gives:

$$B_\lambda = (\text{Log}\ (I_{o\lambda} / I_\lambda\ S))/M_h - b_{h\lambda} - k_\lambda$$

where $b_{h\lambda}$ is the scattering due to air molecules at height h. The resulting

* Note the sun photometer was operated at the William Campbell residence about seven miles from the airport site.

base 10 absorption and extinction coefficients per optical air mass are 0.434 times the base e absorption and extinction coefficients. (Malm, 1977). However, all results presented in this report are in base e and at station pressure, not sea level pressure.

The sunphotometer does not measure the actual irradiance but rather it provides a meter deflection J_λ in microamperes which is directly proportional to I_λ . Similarly, $J_{o\lambda}$, which is the instrument calibration factor, is the meter reading when the irradiance is $I_{o\lambda}$. The diopter scale on the sunphotometer provides values of the relative optical air mass, M_h.

However, the relative optical air mass was calculated in this case by the following set of equations:

$$m = \sec \theta_o \text{ for zenith angles 0 to } 60^o$$

$$m = \sec \theta_o - 3.93 \times 10^{-4} \sec 0_o{}^{3.65} \, p/p_o$$

$$\text{for } \sec \theta_o > 1.5$$

$$m = \sec \theta_o - 8.61 \times 10^{-4} \sec \theta_o{}^{2.69} \, p/p_o$$

$$\text{for } 1.5 < \sec \theta_o < 15.0$$

where p= site pressure and p_o = sea level pressure, and θ_o = solar zenith angle (Hullstrom, 1977). The solar zenith angle may be calculated by the equation:

$$\cos \theta_o = \sin \phi \sin \delta + \cos \phi \cos \delta \cos t$$

where: ϕ = latitude of site

δ = solar declination for that day

t = solar hour angle (angle between apparent noon and time of observation)

Solar hour angle = (true solar noon (MST) - 12:00 MST + longitude correction- equation of time for date) x 15°/hour

longitude correction = (site longitude - standard meridian (105 deg W) of mountain time zone) x 4 min/deg. longitude.

The value obtained should be positive if the site is west of the meridian and negative if east. The longitude of the airport site is 114° 16' W. The equation of time and the solar declination were obtained from standard astronomical tables (American Ephemeris and Nautical Almanac, 1978).

Using the same theory regarding turbidity and the sun photometer, measurements were made for the 300 to 2800 nm broadband and for 300 to 700 nm wavelengths.

The normal incident direct solar irradiance was measured continuously with two Eppley pyrheliometers. One unit was unfiltered and monitored the 300 to 2800 nm wavelength while the other unit had a RG - 8 filter which allowed only the 300 to 700 nm wavelength to be measured. This then allowed the indirect measurement of the 700 to 2800 nm wavelength which contains the region most affected by water vapor absorption. Similarly two Eppley pyranometers were used to measure the same two wavelength bands as the pyrheliometers only this time measuring the total solar irradiance. From comparisons of the two measurement methods an indirect measure was made of the amount of diffuse or scattered solar radiation on a continuous basis. As with the turbidity measurements, all results for the diffuse radiation are given in base e, at station pressure and using the Volz (1959) method.

The integrating nephelometer used in the study was a Meteorology Research Incorporated Model 1550. The theory of measurements of the nephelometer is similar to that of the diffuse radiation and sun photometer except that an artificail light source is used and the transmittance over the 500 nm wavelength is measured. The instrument used in this study also included an intake air heater to reduce the relative humidity below 70

percent. This reduces the amount of scattering due to moisture condensed on particles drawn into the instrument.

A. Turbidity

Tables 30 and 31 summarize the daily trends in atmospheric turbidity for the northern Flathead Basin. Table 32 gives a comparison of the Flathead turbidity data with that from other sites in Montana. The measurements were made through the use of a five channel sun photometer. Of the five channels shown, the 880 nm and 940 nm are most important for determining the contribution of water vapor absorption to the turbidity. The 940 nm channel is centered in the wavelength band where the greatest amount of water vapor absorption occurs. The 880 nm wavelength is centered in the "window" where water vapor has little effect on the turbidity. The 440, 500, and 640 nm wavelengths are the areas of the greatest effect of particles on scattering of sunlight. Some water vapor absorption also does occur in the smaller wavelengths also. Sunlight at different wavelengths is scattered greatest when the wavelength of the light is nearest the diameter of the particle (i.e. 500 nm light is best scattered by a 500 nm radius particle). Therefore some inference can be made about the size of the particles that are having the greatest effect on the turbidity (Note as the value of the turbidity increases, the greater the amount of scattering or absorption of the sunlight).

Now if one first looks at the 440 nm wavelength, two basic trends are evident. These trends are: (1) The turbidity is at minimum at 0900 MST, increases to a maximum at 1200 MST, and then decreases slightly at 1500 MST; and (2) The turbidity increases from a minimum in winter to a maximum in late spring.

The diurnal trend of turbidity is probably due primarily to: (1) thermal mixing at the earth's surface which carries dust particles into the air,

(2) the increased activities of people in the area causing more pollution to be emitted; and (3) and increase in the amount of water vapor in the air at mid-day due to evaporation and transpiration.

The 500 nm channel shows a similar trend to that of the 440 nm channel. Highest turbidities occur during the 1200 MST time and also during the late spring (April and May). The lowest turbidities occur at 0900 MST and also during the winter (December and January).

The 640 nm channel does not show the same seasonal trend as the 440 and 500 nm channels. However, a similar diurnal trend is evident. The monthly or seasonal trend for the 640 nm wavelength shows lowest values during the summer (especially August). The highest turbidities occurred several times during the year, in November and December and again in April.

The 880 nm wavelength turbidities again show a similar diurnal pattern to that of the 400 nm wavelength. The seasonal trend is toward higher values in April and May and lower values several times during the year (especially in August, October, December, and January).

The 940 nm wavelength, the wavelength most affected by water vapor absorption, does not show any diurnal trend. The seasonal trend simply shows highest turbidities from April through September and lowest turbidities in January. This would tend to indicate a greater amount of water vapor present in the spring and summer and lesser amount present in the winter.

B. Diffuse Radiation

Tables 33 through 36 summarize the nine months of diffuse radiation measurements made using the two bands of wavelengths. The diffuse solar radiation measurements are made using two sets of pyronometers and pyrehelio-meters. One set measures the solar irradiance over the wavelength band of 300 to 2800 nm while the second set measures the wavelength band of 300 to

700 nm. The pyranometer measures the total solar radiation coming in at all directions over a hemisphere. These measurements include both the direct solar beam radiation and the scattered or diffuse solar radiation. The pyrheliometer measures only the direct beam solar radiation. Therefore, using the combination of the two instruments the amount of diffuse radiation can be calculated. Also using the two wavelength bands a measurement of the diffuse radiation due primarily to particles in the air versus that due to water vapor can be determined as the 700 to 2800 nm wavelength band contains most of the interval in which water vapor affects the solar radiation.

Looking first at the 300 to 2800 nm wavelength band, a variety of statistics are displayed in Table 33. The two measurements of primary concern here are the diffuse sky irradiance and the extinction coefficient (related to turbidity except that no effect of Rayleigh scattering and ozone absorption have been subtracted out). The diffuse radiation values for the period shown show a similar trend to that of the 440 nm wavelength sunphotometer measurements. The diffuse measurements display a trend toward lowest values in the late autumn and early winter and highest values values in mid-spring (April). Additional measurements for the remainder of the year will have to be examined to see if the pattern continues. The extinction coefficient shows a similar trend as the diffuse measurements. The highest extinction average occurred during April with the lowest occurring in January.

Table 34 shows the same variables for the 300 to 700 nm wavelength band. Looking again at the diffuse radiation values, the values are much smaller than the 300 to 2800 nm wavelength values. The portion of the diffuse radiation for the broadband (300 to 2800 nm) occurring in the 300 to 700 nm wavelength is approximately 50 percent. The seasonal trend of the 300 to 700 nm shows a pattern similar to the pattern of the broadband with lowest

values in the late autumn and early winter and highest values in the late spring. The extinction coefficient again shows a similar pattern as the diffuse radiation. However, the lowest period of coefficients has shifted to January rather than November or December.

The 700 to 2800 nm wavelength statistics (Table 35) again shows the same pattern as the previous wavelengths. The only notable point is that the 700 to 2800 nm wavelength accounts for approximately 50 percent of the total diffuse radiation of the 300 to 2800 nm band.

Figures 1 through 9 display the diurnal pattern of the three wavelength bands for the extinction coefficient for the nine month period samples. The pattern shows an increase of coefficients from morning to mid-afternoon followed by a slight decrease. The pattern is similar throughout the nine month period with the only exception being the time of the maximum extinction coefficient. In August, the maximum value occurs between 1300 and 1500 MST. The time of maximum value shift to 1100 to 1200 MST by November and back to 1300 MST by February, upon which the time of maximum again decreases to 1000 MST by April.

The greatest significance of the diffuse radiation measurements is probably in the fact that a baseline of present visibility related conditions has been established. As additional measurements are made and pollution levels increase or decrease the change in diffuse radiation can be tracked and an actual number of precise measure of the related visibility change can be determined.

C. Scattering Coefficient

The last measure of visibility related parameters made during the first year of the study was done with the integrating nephelometer. The nephelometer measures a scattering coefficient over approximately a one meter interval using an artificial light source. Table 36 summarizes the scattering

coefficients for a ten month period. The monthly arithemetic mean and the maximum reading for the month are given in the table. The seasonal trend show highest scattering or visibility reduction occurring during January. The lowest scattering occurred during September and June. This is the reverse of the results of the diffuse radiation and turbidity measurements. The difference may in part be due to the fact that the nephelometer is measuring the scattering coefficient at a point or within a small area of the sampler whereas the diffuse radiation and the turbidity measurements are related to scattering between the instrument and the edge of the atmosphere. Each instrument then has its own use and limitations.

Table 30

Flathead Basin Atmospheric Turbidity Data (Volz Base e)
Daily Trends

August, 1978 - June, 1979

Month	Average 440 nm 0900	1200	1500 (MST)	Average 500 nm 0900	1200	1500 (MST)	Average 640 nm 0900	1200	1500 (MST)
August, 1978	0.15	0.22	0.21	0.07	0.11	0.11	0.05	0.06	0.07
September	0.18	0.19	0.26	0.13	0.09	0.15	0.09	0.05	0.11
October	0.14	0.25	0.22	0.08	0.16	0.13	0.06	0.11	0.09
November	-	0.20	0.23	-	0.17	0.16	-	0.13	0.12
December	0.09	0.20	0.15	0.07	0.15	0.09	0.07	0.13	0.08
January, 1979	0.12	0.18	0.19	0.08	0.12	0.14	0.07	0.09	0.11
February	0.45*	0.18	0.23	0.40*	0.11	0.17	0.39*	0.09	0.14
March	0.16	0.23	0.24	0.10	0.14	0.15	0.08	0.10	0.10
April	0.29	0.35	0.32	0.20	0.24	0.19	0.14	0.18	0.12
May	0.23	0.28	0.24	0.14	0.17	0.13	0.09	0.10	0.08
June	0.27	0.28	0.26	0.16	0.15	0.13	0.11	0.08	0.08

* Only one measurement taken for monthly average.

TABLE 31

Flathead Basin Atmospheric Turbidity Data (Volz Base e)
Daily Trends

August 1978 - June 1979

Month	Average 880 nm 0900	1200	1500 (MST)	Average 940nm 0900	1200	1500(MST)
August 1978	0.05	0.07	0.07	0.35	0.37	0.37
September	0.09	0.05	0.09	0.32	0.34	0.45
October	0.04	0.09	0.07	0.22	0.28	0.30
November	--	0.11	0.08	--	0.21	0.22
December	0.05	0.09	0.04	0.08	0.14	0.08
January 1979	0.04	0.06	0.06	0.06	0.08	0.11
February	0.35*	0.06	0.08	0.46*	0.13	0.15
March	0.06	0.09	0.08	0.15	0.16	0.18
April	0.12	0.18	0.08	0.32	0.32	0.20
May	0.08	0.12	0.09	0.29	0.32	0.28
June	0.10	0.09	0.08	0.38	0.35	0.40

*Only one measurement taken for monthly average

TABLE 32

MONTANA ATMOSPHERIC TURBIDITY DATA (Volz Base e)

AVERAGE 500 nm WAVELENGTH (1200 MST)

MONTH	COLUMBIA FALLS	ANACONDA	BILLINGS	BUTTE	HELENA	MISSOULA	SCOBEY
August, 1978	0.11	0.22	0.15	0.13	----	0.17	0.08
September	0.09	----	0.13	0.11	0.11	0.19	0.11
October	0.16	0.21	0.10	0.10	0.11	0.13	0.10
November	0.17	----	0.12	----	0.13	0.34	----
December	0.15	----	----	----	----	0.16	----
January, 1979	0.12	0.14	0.28	0.17	0.14	0.24	0.07
February	0.11	0.10	0.26	0.11	----	0.34	0.18
March	0.14	0.29	0.29	0.19	0.18	0.21	0.16
April	0.24	----	0.35	----	0.28	0.24	0.15
May	0.17	----	0.48	0.36	0.20	0.25	0.17
June	0.15	----	0.41	----	----	0.20	----

Flathead Basin Area Summary of Average Hourly Solar Radiation (1978-1979)

Wavelength: 300 to 2800nm

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Incident Solar Radiation	0.45	0.36	0.37	0.18	0.18	0.22	0.22	0.41	0.33			
Normal Incident Direct Solar Radiation	0.43	0.24	0.51	0.17	0.12	0.18	0.05	0.38	0.20			
Diffuse Sky Irradiance	0.19	0.22	0.14	0.12	0.12	0.15	0.19	0.19	0.22			
Ratio of Diffuse to Total	0.52	0.74	0.47	0.74	0.84	0.67	0.75	0.59	0.71			
Fractional Transmittance of Direct Solar Beam	0.30	0.22	0.35	0.28	0.19	0.32	0.15	0.40	0.19			
Fractional Transmittance of Total Solar Radiation Possible	0.54	0.52	0.59	0.60	0.68	0.78	0.63	0.71	0.50			
Fraction Diffuse is of Total Possible Solar Radiation	0.25	0.30	0.24	0.31	0.49	0.46	0.47	0.31	0.31			
Extinction Coefficient (Base e)	0.81	1.04	0.50	0.47	0.50	0.42	0.92	0.57	1.25			

TABLE 34

Flathead Basin Area Summary of Average Hourly Solar Radiation (1978-1979)

Wavelength: 300 to 700nm

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Incident Solar Radiation	0.26	0.20	0.20	0.10	0.09	0.13	0.12	0.22	0.22			
Normal Incident Direct Solar Radiation	0.28	0.15	0.30	0.11	0.09	0.17	0.05	0.21	0.14			
Diffuse Sky Irradiance	0.10	0.11	0.08	0.06	0.06	0.07	0.10	0.11	0.13			
Ratio of Diffuse to Total	0.47	0.70	0.49	0.73	0.81	0.61	0.82	0.63	0.71			
Fractional Transmittance of Direct Solar Beam	0.19	0.13	0.19	0.16	0.14	0.23	0.09	0.20	0.14			
Fractional Transmittance of Total Solar Radiation Possible	0.31	0.29	0.35	0.33	0.41	0.44	0.38	0.38	0.33			
Fraction Diffuse is of Total Possible Solar Radiation	0.12	0.16	0.15	0.17	0.27	0.21	0.29	0.18	0.19			
Extinction Coefficient (Base e)	0.99	1.21	0.73	0.68	0.61	0.47	1.24	0.98	1.34			

Flathead Basin Area Summary of Average Hourly Solar Radiation (1978-1979)

Wavelength: 700 to 2800nm

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
Incident Solar Radiation	0.19	0.17	0.17	0.08	0.08	0.10	0.11	0.19	0.15			
Normal Incident Direct Solar Radiation	0.16	0.10	0.22	0.07	0.04	0.06	0.02	0.14	0.09			
Diffuse Sky Irradiance	0.09	0.11	0.06	0.06	0.06	0.07	0.10	0.09	0.10			
Ratio of Diffuse to Total	0.59	0.74	0.47	0.71	0.83	0.71	0.75	0.62	0.71			
Fractional Transmittance of Direct Solar Beam	0.16	0.10	0.16	0.12	0.08	0.11	0.06	0.16	0.09			
Fractional Transmittance of Total Solar Radiation Possible	0.26	0.25	0.27	0.26	0.30	0.34	0.29	0.33	0.22			
Fraction Diffuse is of Total Possible Solar Radiation	0.11	0.15	0.11	0.14	0.22	0.24	0.23	0.17	0.14			
Extinction Coefficient (Base e)	1.19	1.45	0.83	0.77	0.69	0.70	1.25	1.02	1.72			

TABLE 36

Flathead Basin Scattering Coefficient
September 1978 - June 1979
Values in scattering coefficient X 10**5

Months	Arithmetic Mean	Maximum Reading*
September, 1978	9	29
October	16	41
November	16	52
December	14	48
January, 1979	32	66
February	17	75
March	15	39
April	11	31
May	10	27
June	11	21

FIGURE 1
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

August 1978

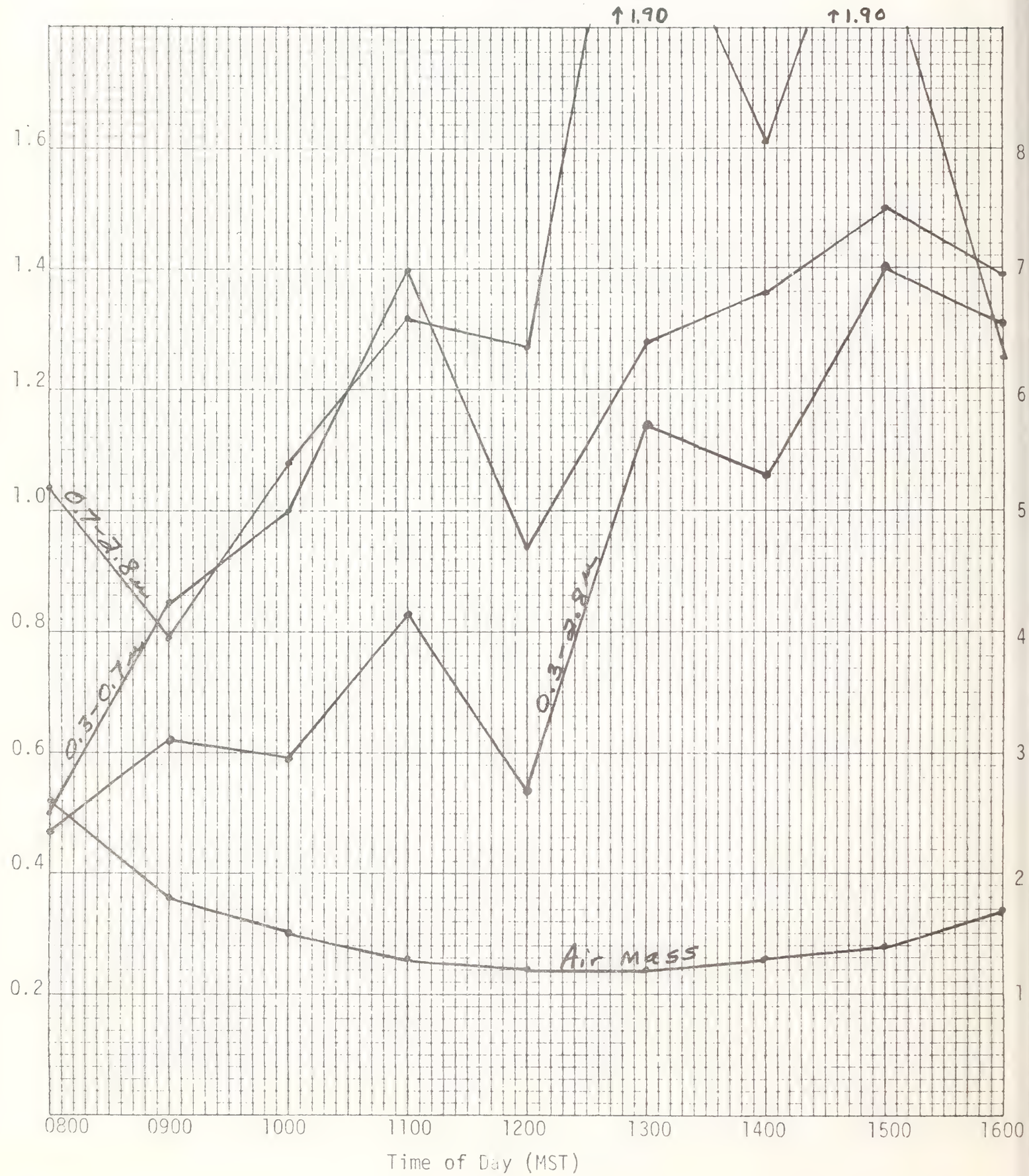


FIGURE 2
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

September 1978

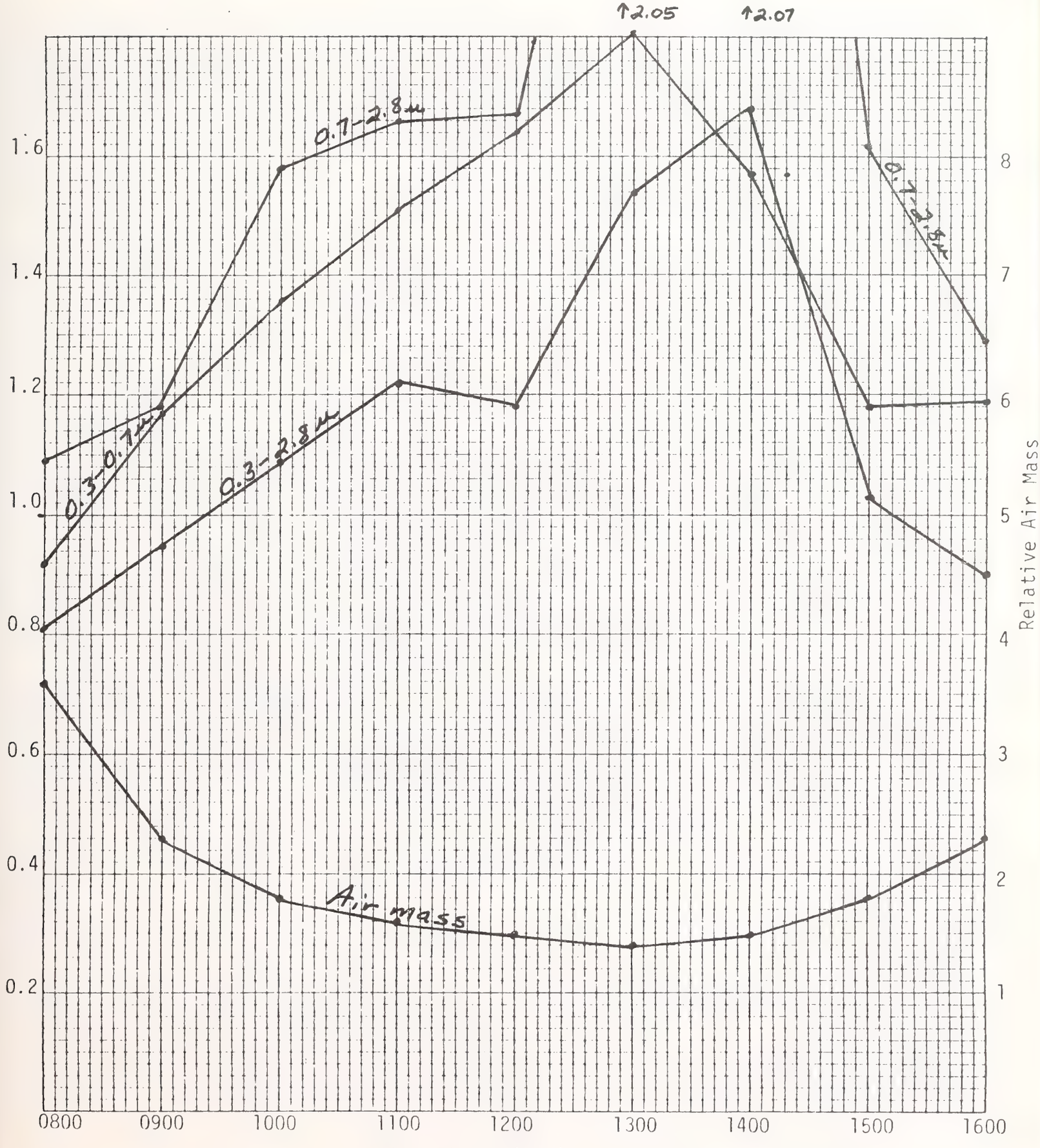


FIGURE 3
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

October 1978

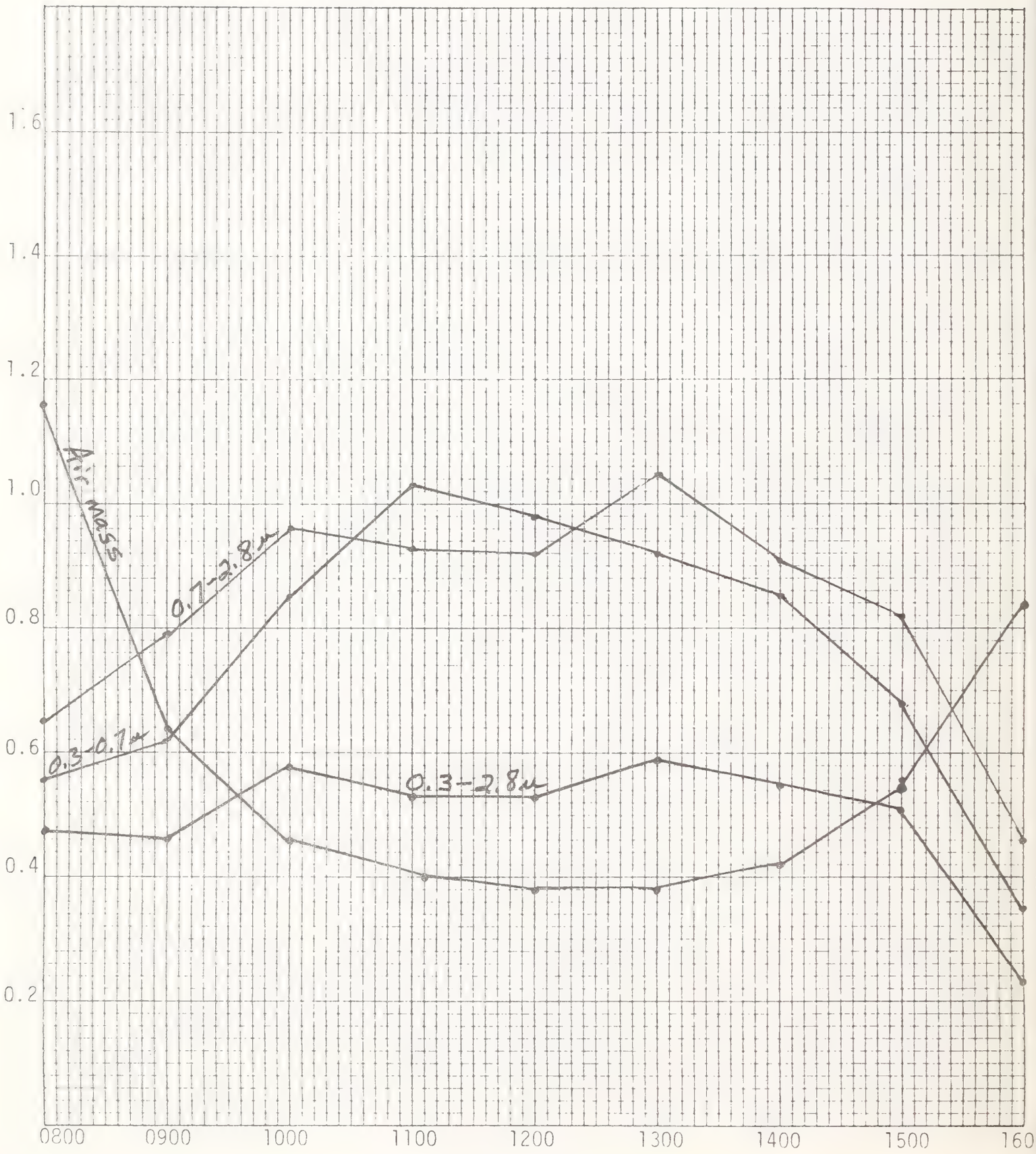


FIGURE 4

Flathead Basin Area Monthly Average Extinction Coefficient Versus Time of Day

November 1978

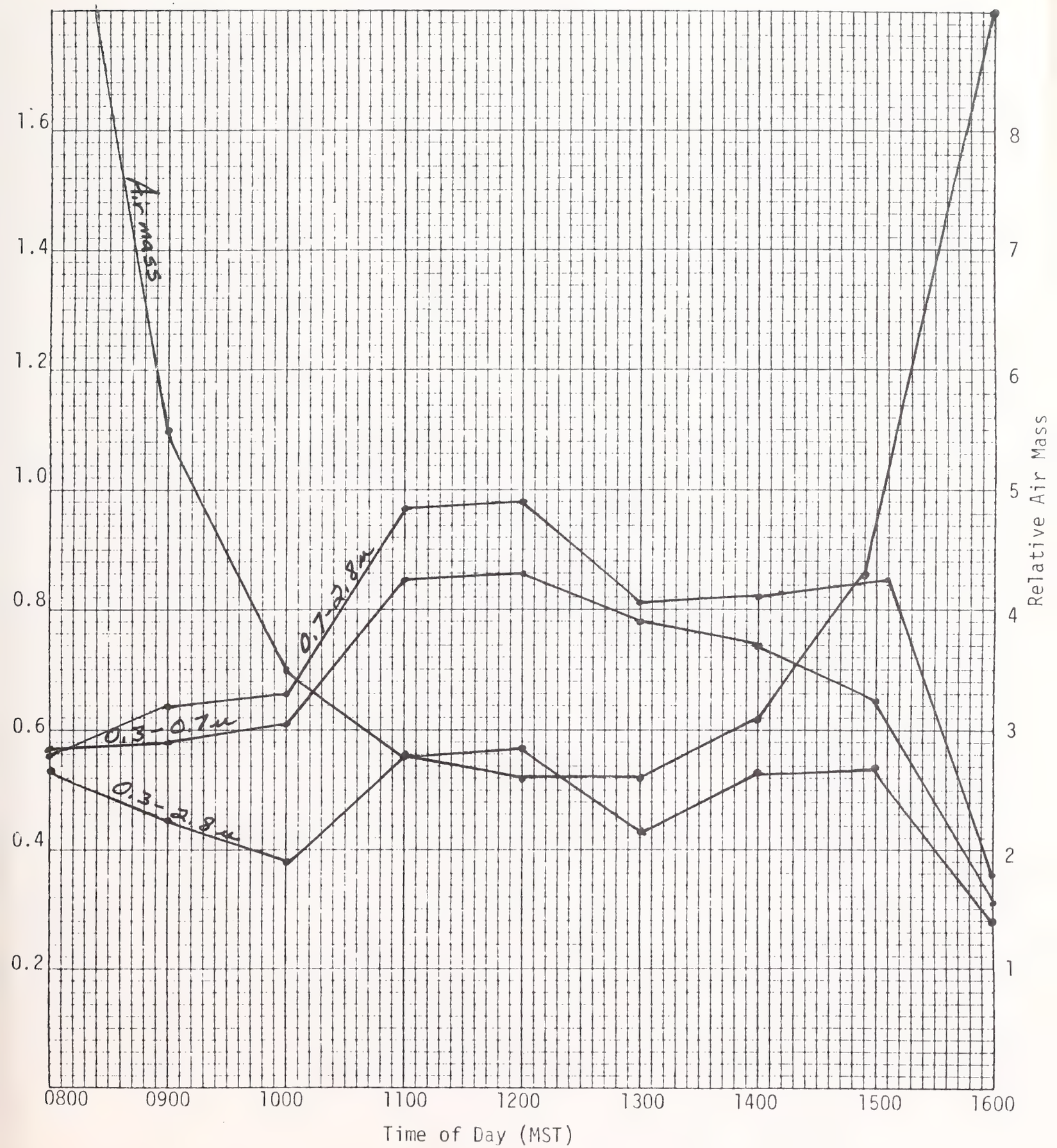


FIGURE 5
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

December 1978

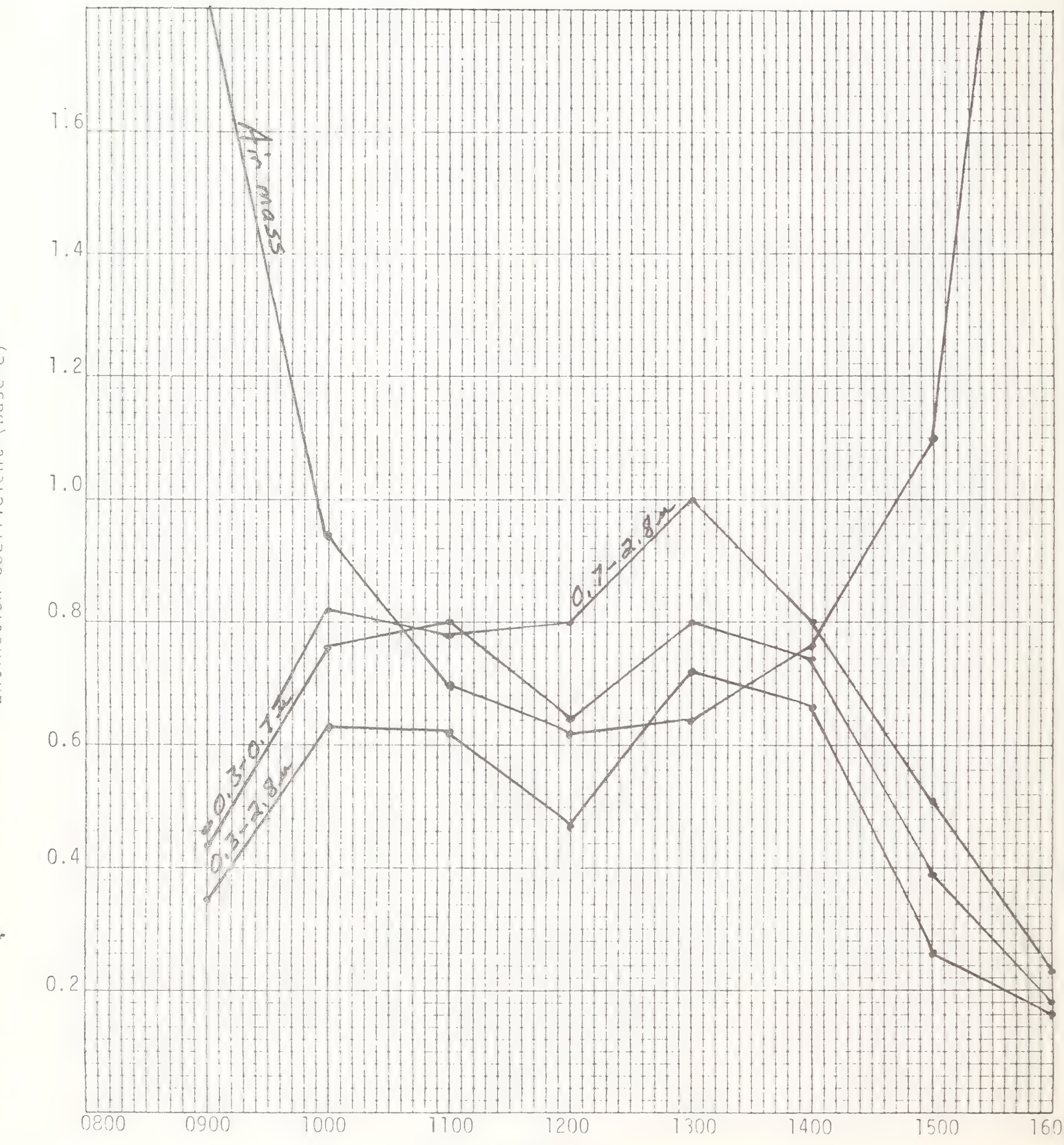


FIGURE 6
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

January 1979

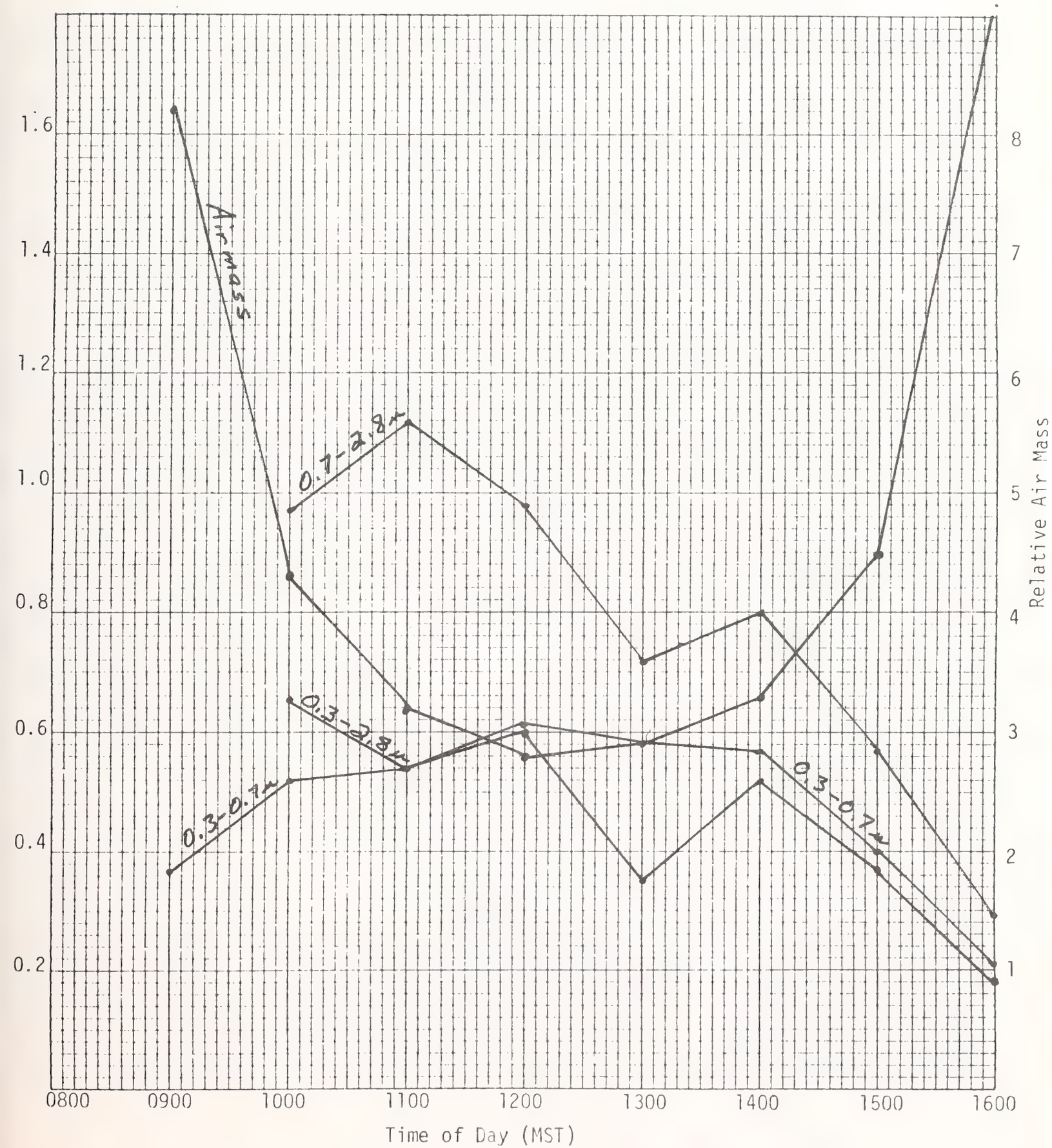


FIGURE 7

Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

February 1979

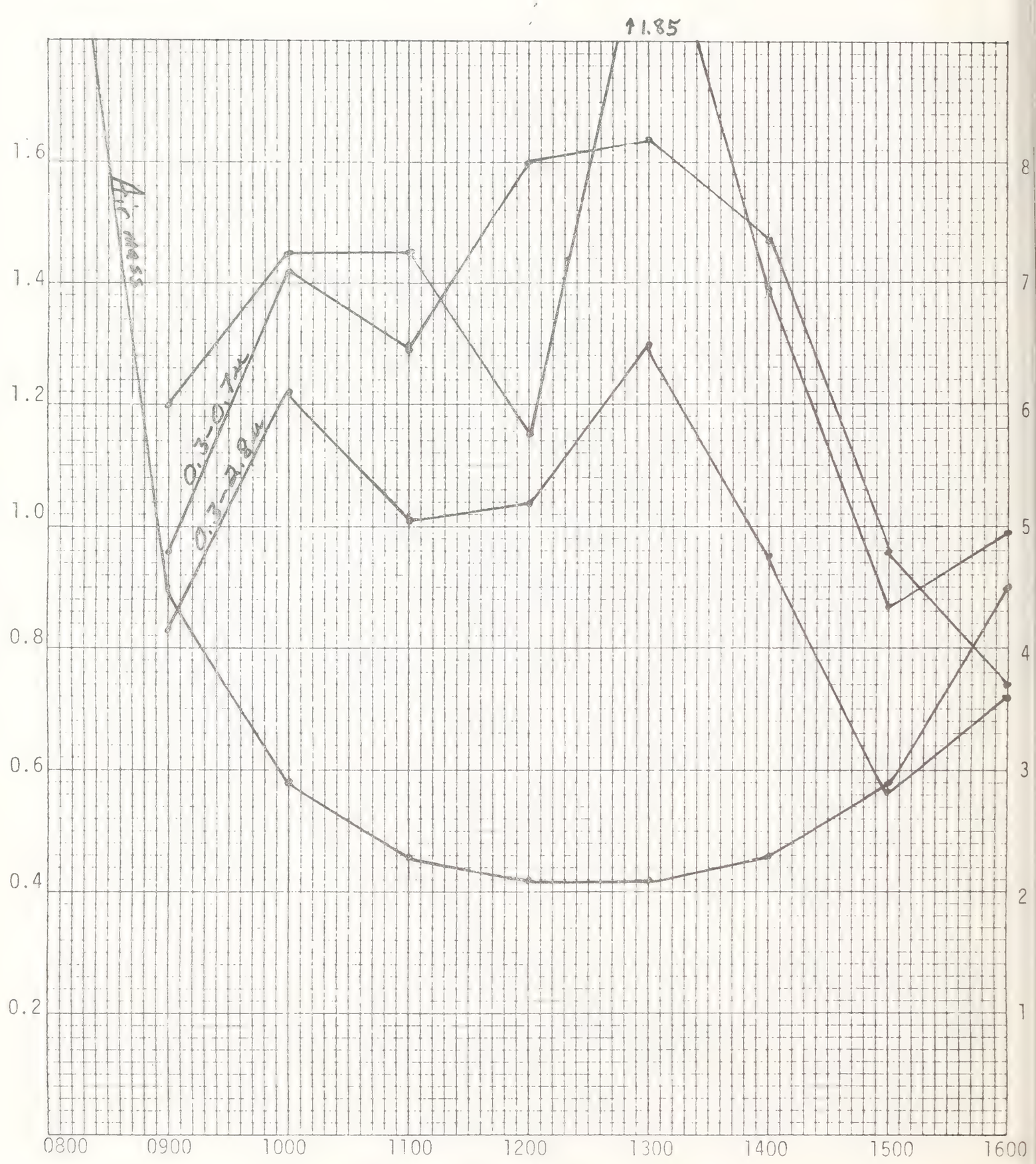


FIGURE 8
Flathead Basin Area Monthly Average Extinction
Coefficient Versus Time of Day

March, 1979

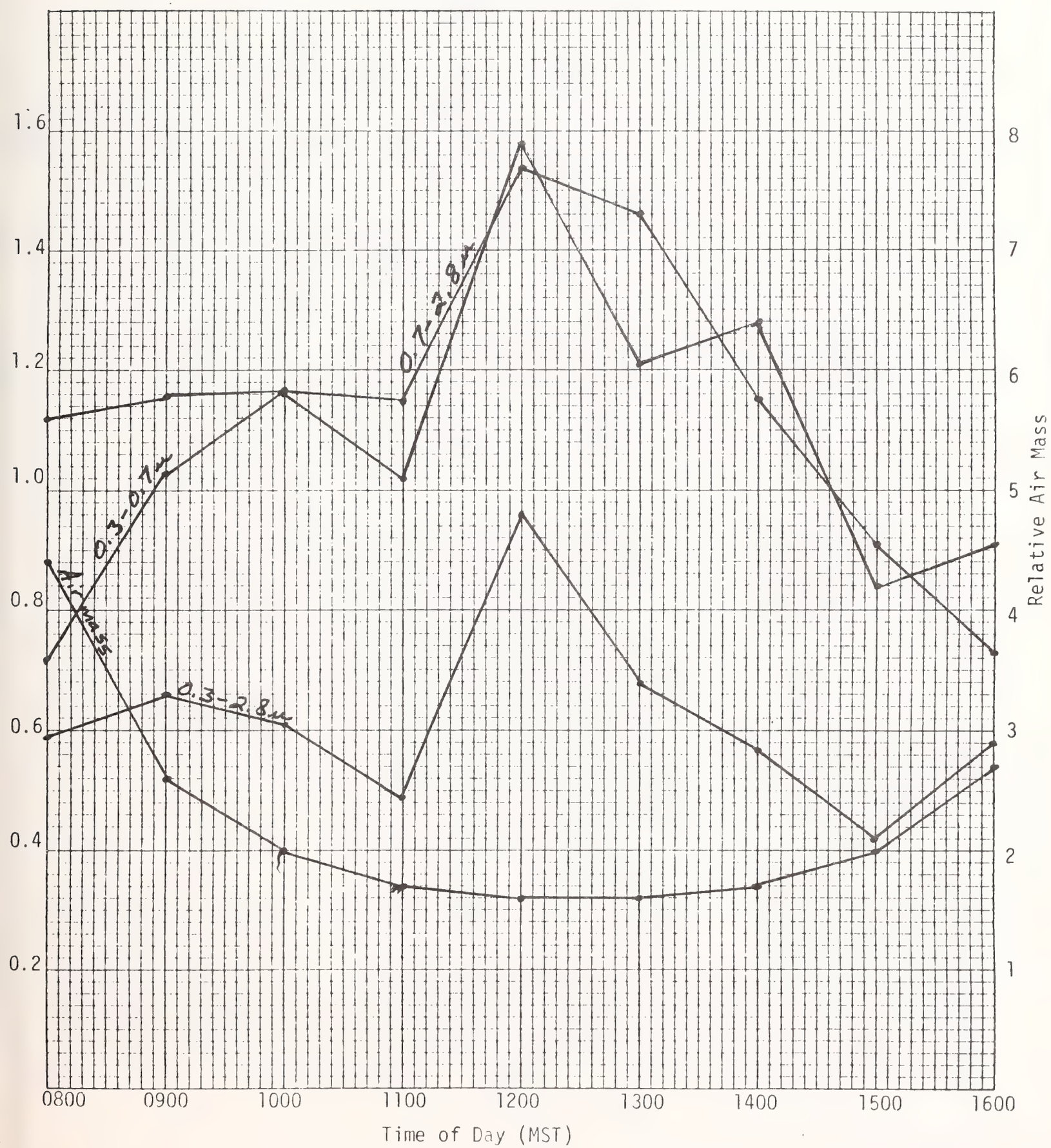
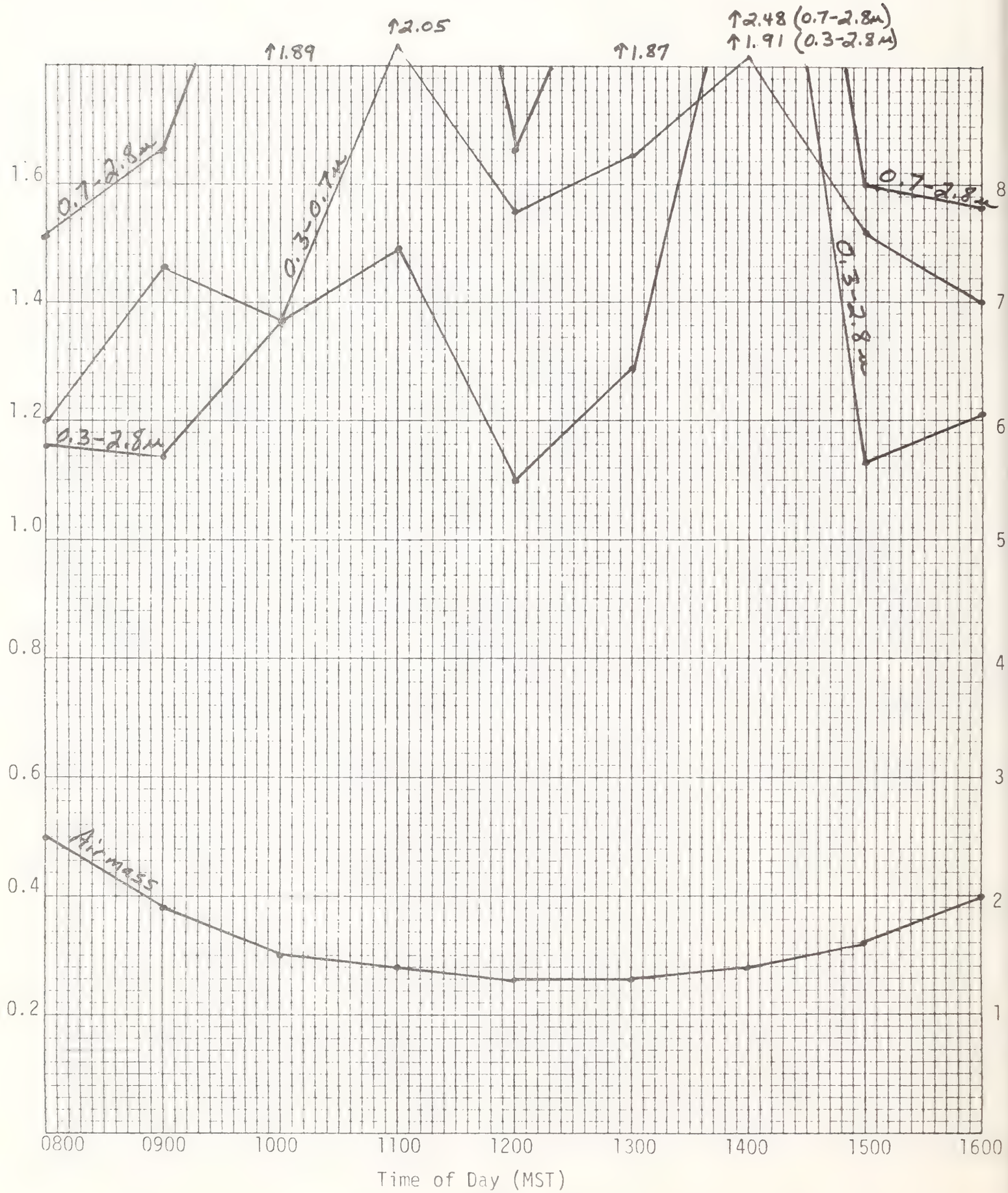


FIGURE 9

Flathead Basin Area Monthly Average Extinction Coefficient Versus Time of Day

April, 1979



V. SUMMARY

One year of baseline air quality data has been collected in the Flathead Basin. Monitoring is continuing and additional work on the emission inventory and simulation modeling is anticipated. The data collected to date has established levels of particulates in populated and remote areas of the basin. Data has also been collected on particle size, sulfates, nitrates, and trace elements.

Meteorological data collection has been conducted for surface and upper air variables. Upper air data collection has been conducted at one central location whereas surface meteorological data collection has been conducted at six locations in the basin.

Visibility related measurements have been taken at one central location in the basin. Measurements have been made for scattering coefficient, turbidity, and diffuse radiation. Monitoring of these variables is continuing in an effort to assess any trend in these variables.

REFERENCES

American Ephemeris and Nautical Almanac, 1977, 1978 and 1979.

Elterman, L., 1968: U. V. Visible, and IR Attenuation for Altitudes to 50 Km Air Force Cambridge Research Laboratories, Bedford, MA.

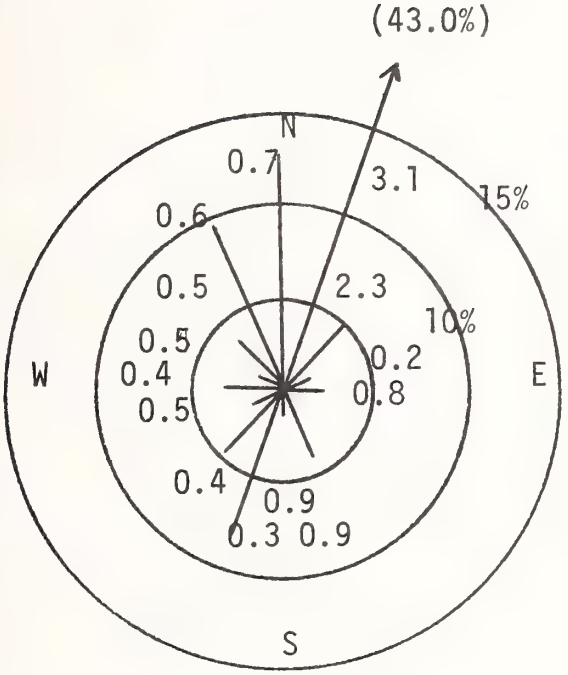
Gelhaus, J.W., et al., 1979: Montana Air Resources Modeling System. Air Quality Bureau, Montana Department of Health and Environmental Sciences, Helena, Montana.

Hullstrom, R. L., 1977: Draft - A Study of Horizontal Visibility and Vertical Atmospheric Optical Properties at Stanton, N.D. April 1976-January 1977. Martin Marietta Corp., Denver, CO.

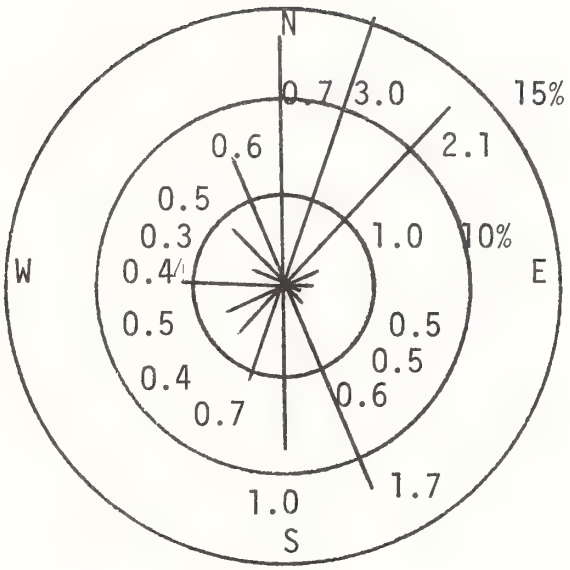
Malm, W. C. et al., 1977: The Effects of Water Vapor, Ozone and Aerosol on Atmospheric Turbidity. J. Appl. Meteor., 16.

Volz, F. E., 1959. Arch. Meteorolog. Geophysics Bioklimatol, B 10, 100.

APPENDIX

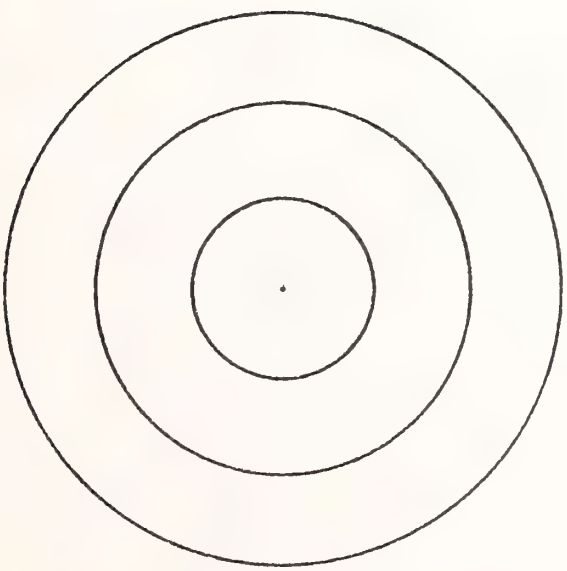


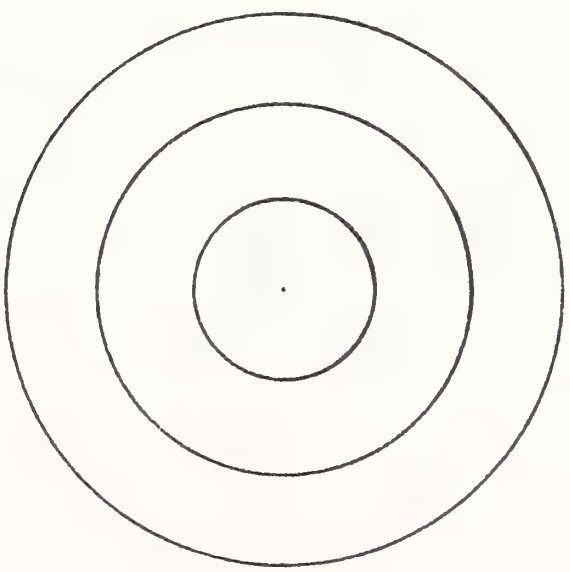
January 1978
Calm 3.9%
(Total Hours 102)

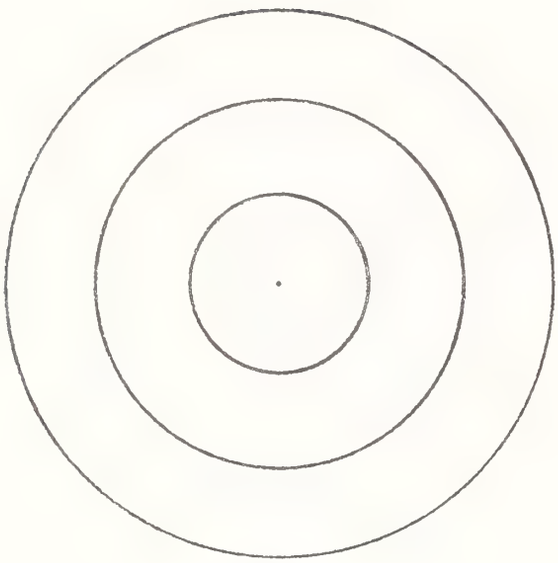


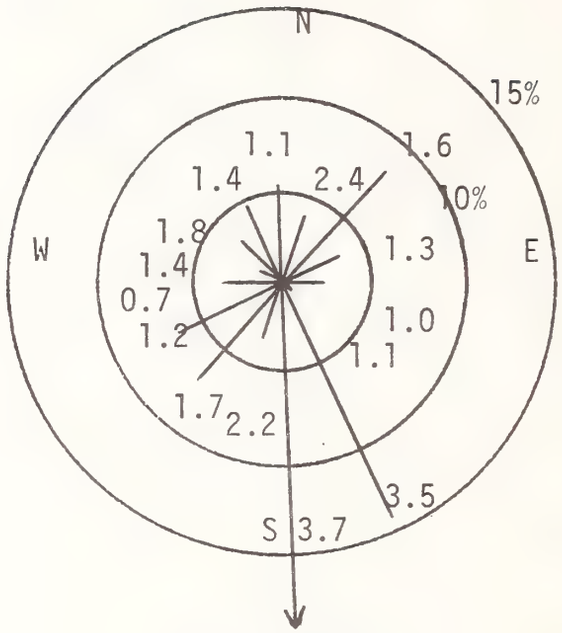
February 1978
Calm 2.6%
(Total Hours 232)

Monthly Wind Roses
Glacier Park International Airport Site
Kalispell, Montana



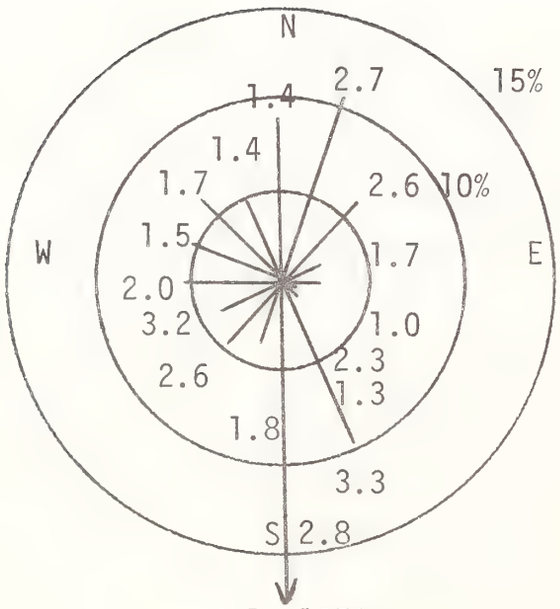




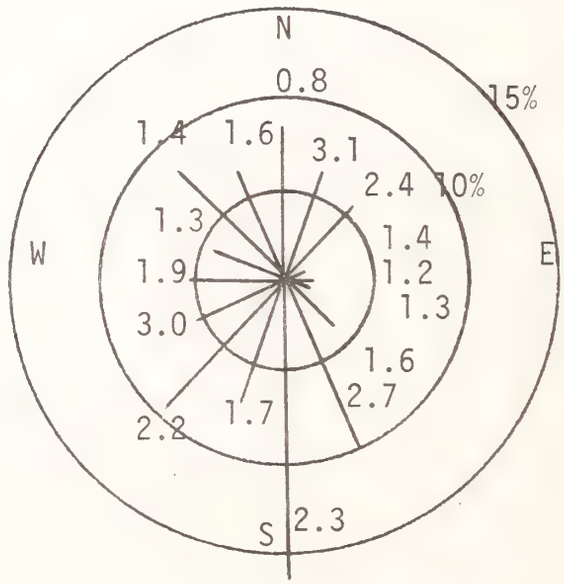


June 1978
Calm 0.0%
(Total Hours 166)

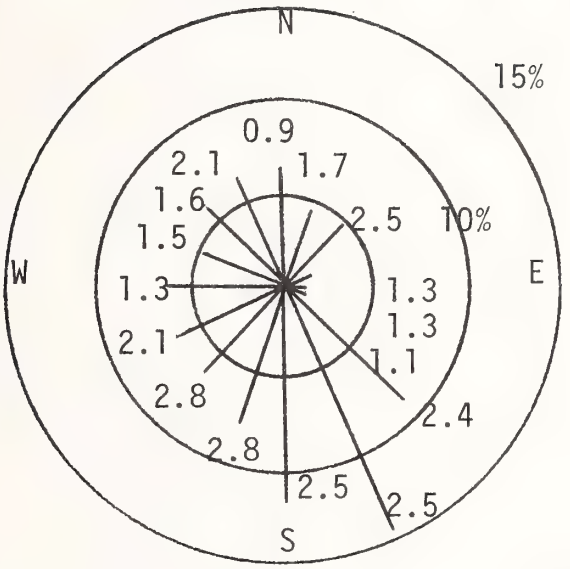
Monthly Wind Roses
Glacier Park International Airport Site
Kalispell, Montana



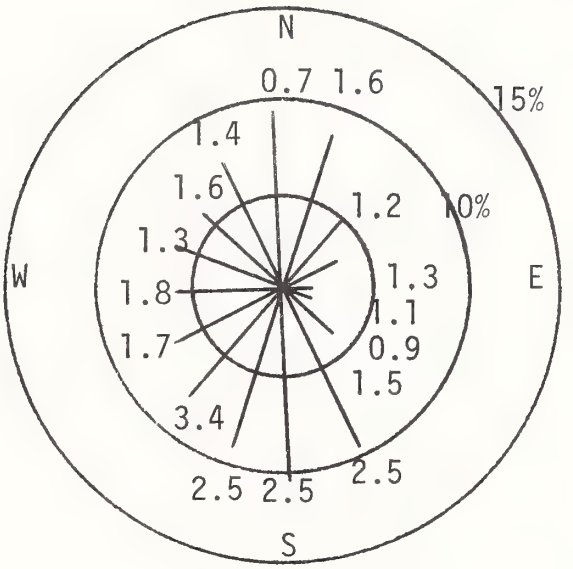
July 1978
Calm 0.0%
(Total Hours 679)



August 1978
Calm 0.0%
(Total Hours 711)

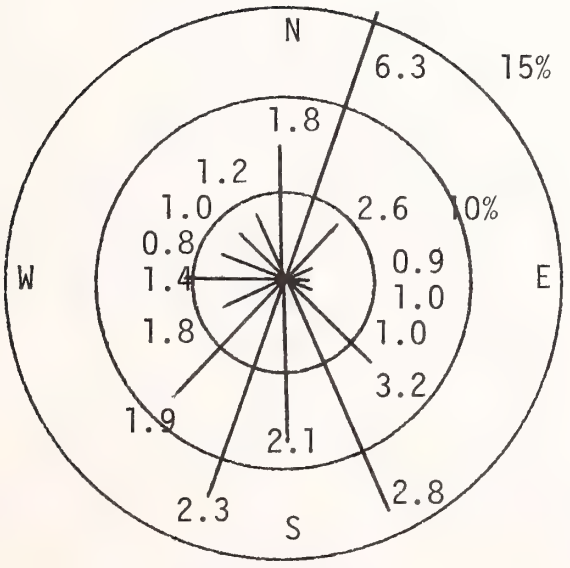


September 1978
Calm 0.0%
(total Hours 705)

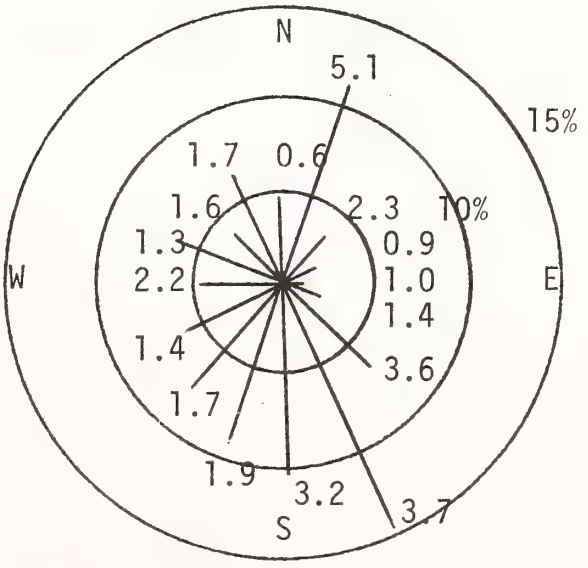


October 1978
Calm 0.0%
(Total Hours 726)

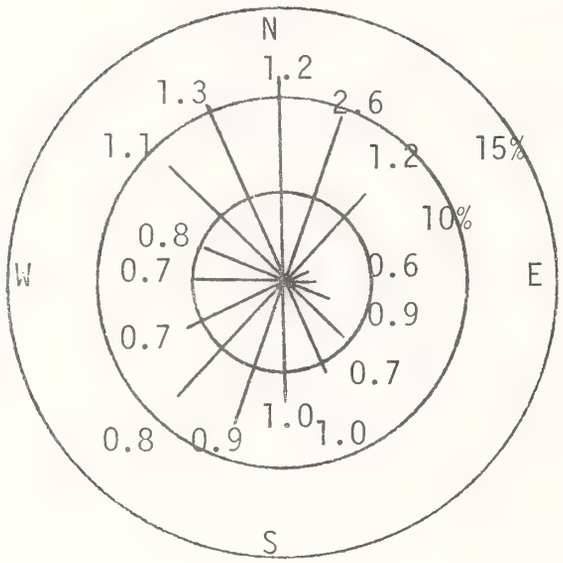
Monthly Wind Roses
Glacier Park International Airport Site
Kalispell, Montana



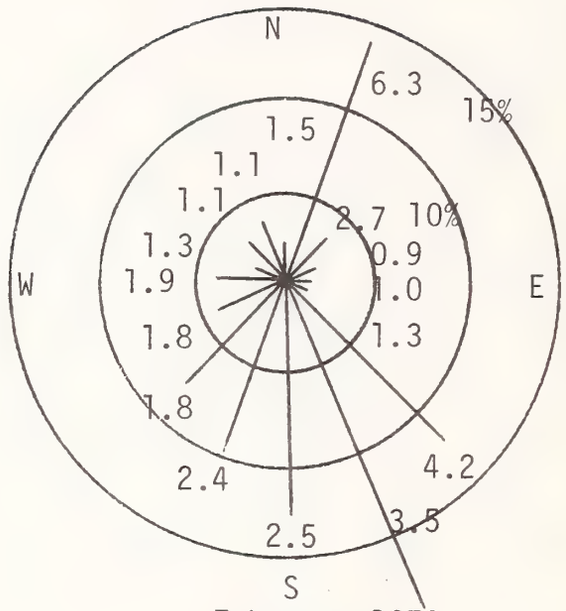
November 1978
Calm 0.0%
(total hours 708)



December 1978
Calm 0.0%
(total hours 732)

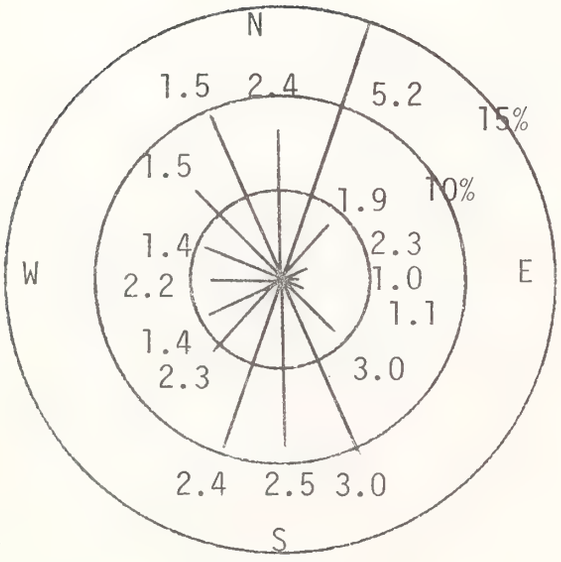


January 1979
Calm 0.0%
(Total Hours 732)

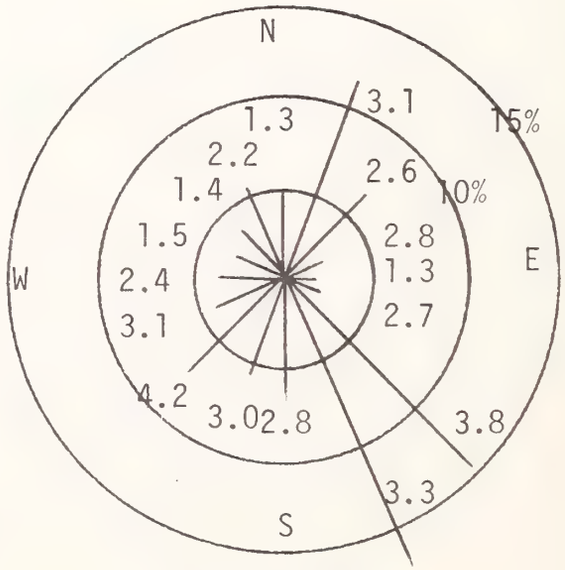


February 1979
Calm 0.0%
(Total Hours 660)

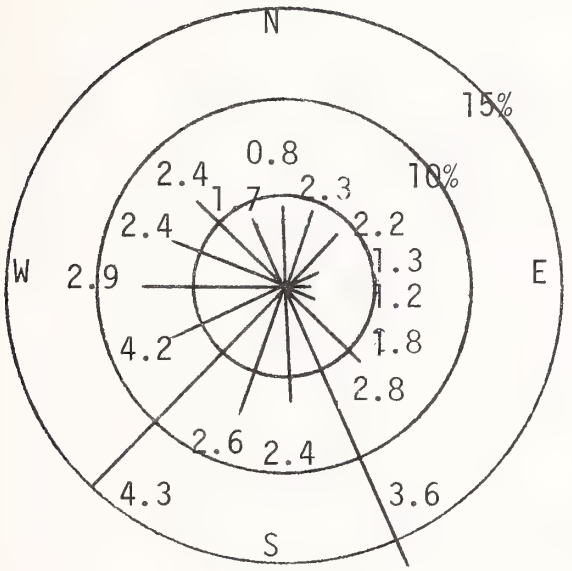
Monthly Wind Roses
Glacier Park International Airport Site
Kalispell, Montana



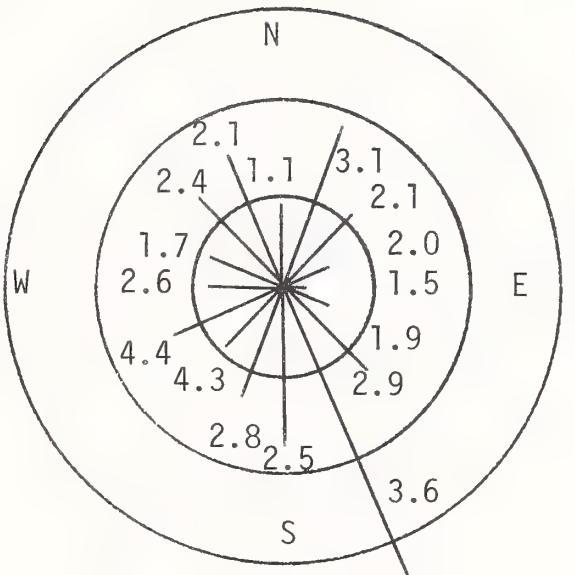
March 1979
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(Total Hours 732)



April 1979
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(Total Hours 702)

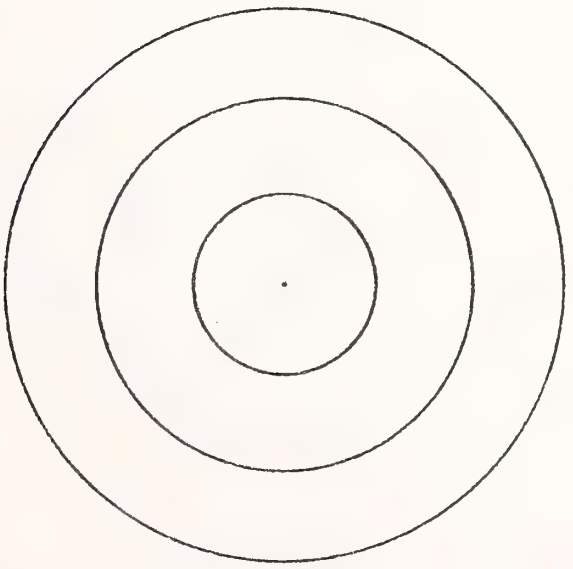


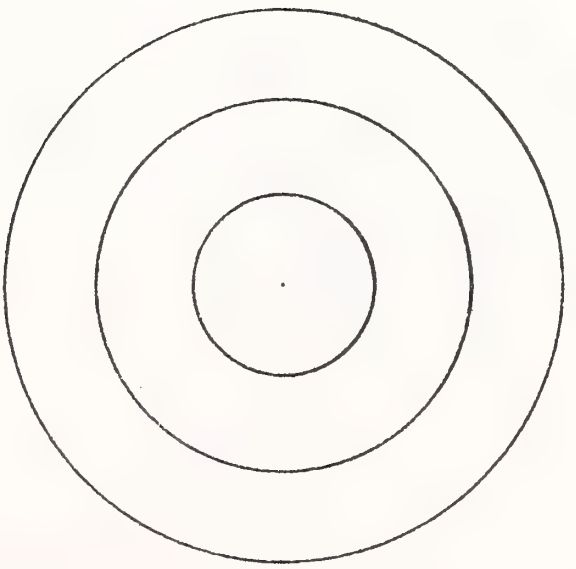
May 1979
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(Total Hours 523)

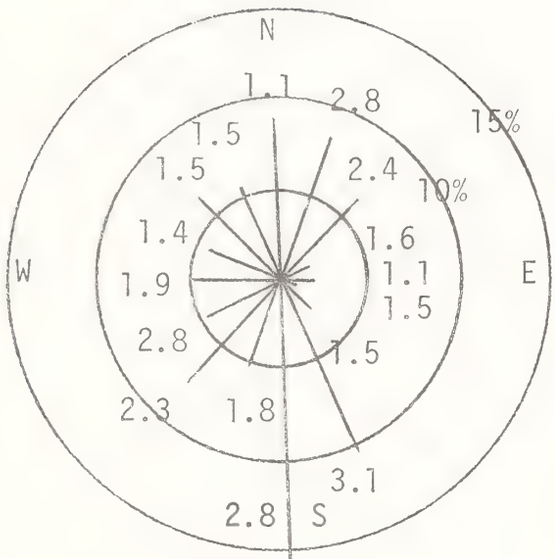


June 1979
Calm 0.1%
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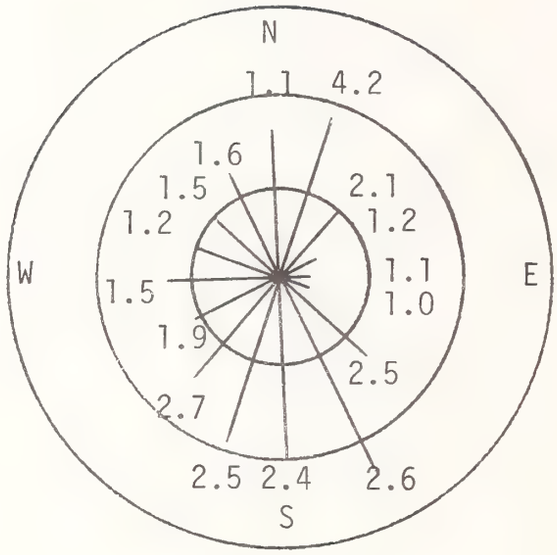
Monthly Wind Roses
Glacier Park International Airport Site
Kalispell, Montana





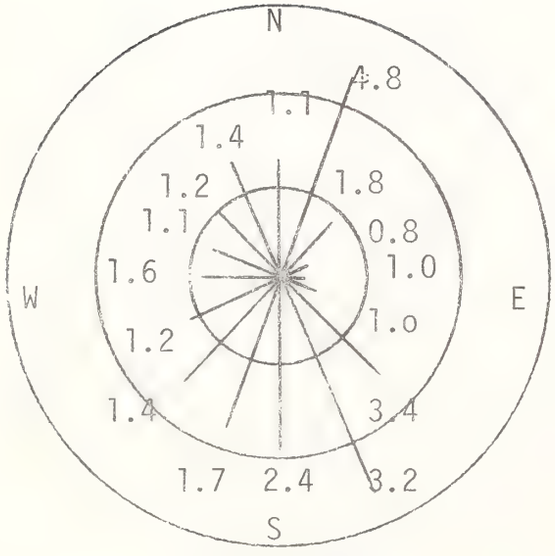


Summer 1978
Calm 0.0%
(Total Hours 1556)

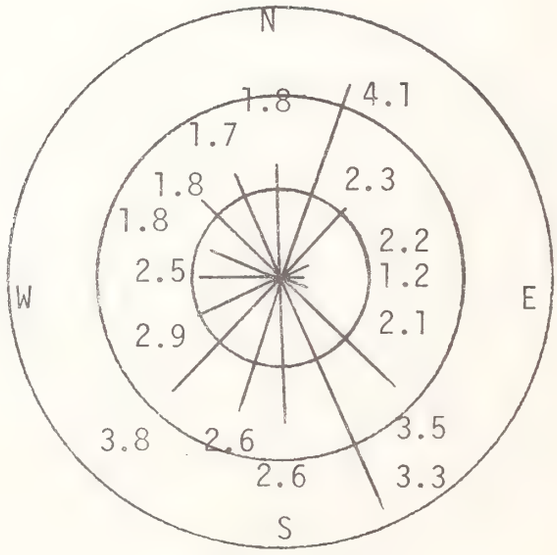


Autumn 1978
Calm 0.0%
(Total Hours 2139)

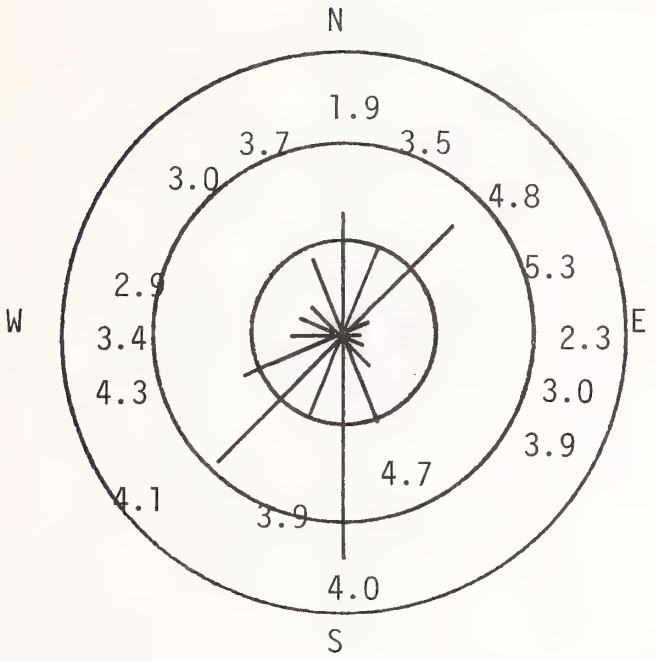
Seasonal Wind Roses
Glacier Park International Airport Site
Kalispell, Montana



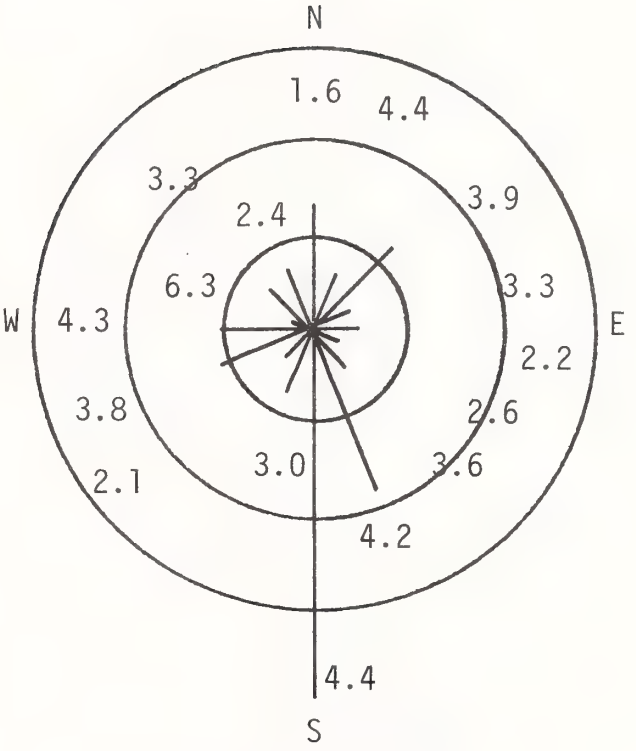
Winter 1978-79
Calm 0.0%
(Total Hours 2124)



Spring 1979
Calm 0.3%
(Total Hours 1957)

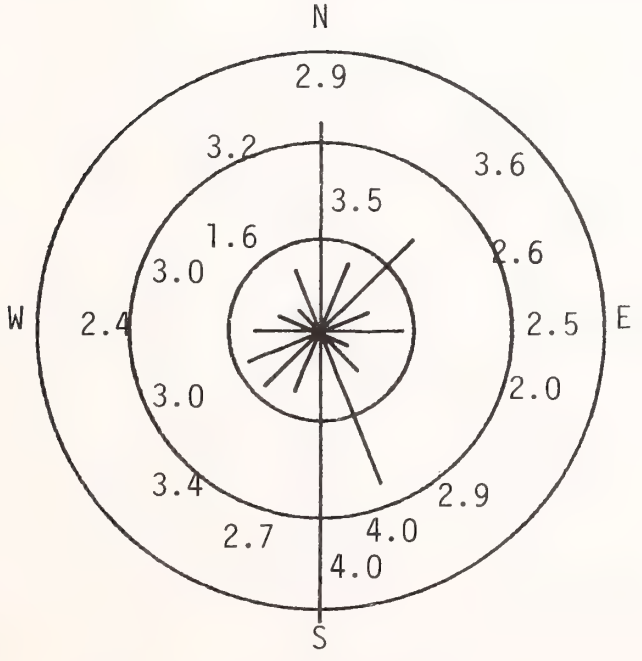


May 1978
Calm 6.5%
(Total Hours 248)

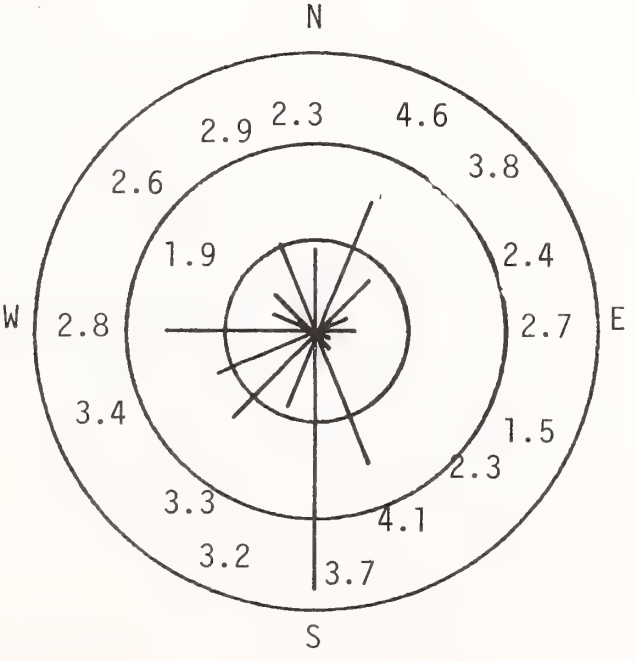


June 1978
Calm 8.8%
(Total Hours 240)

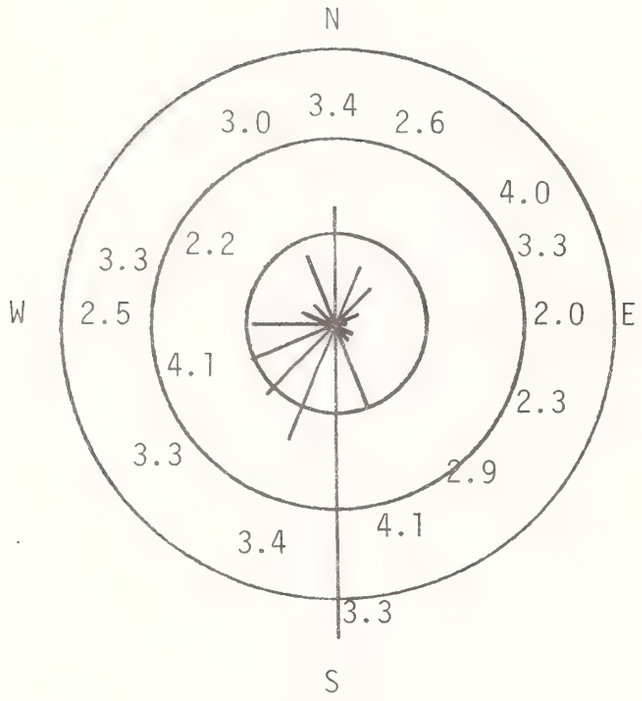
Monthly Wind Roses
National Weather Service
Glacier Park International Airport
Kalispell, Montana



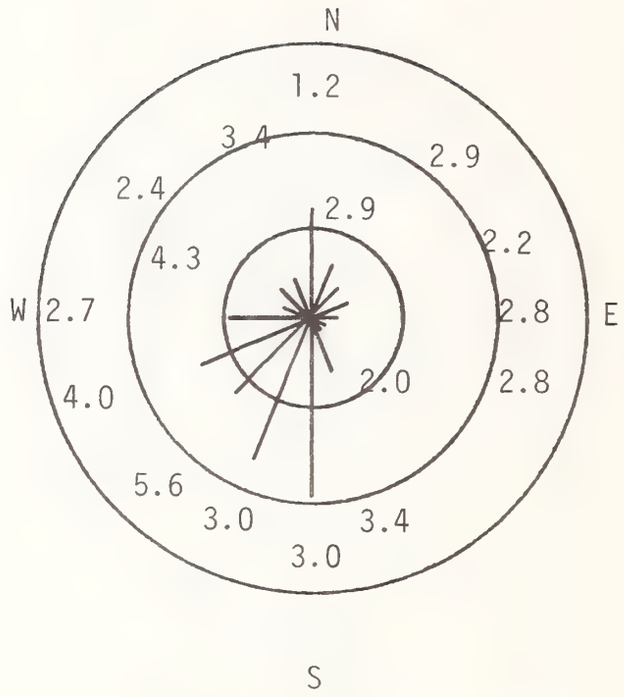
July 1978
Calm 7.3%
(Total Hours 248)



August 1978
Calm 8.5%
(Total Hours 248)

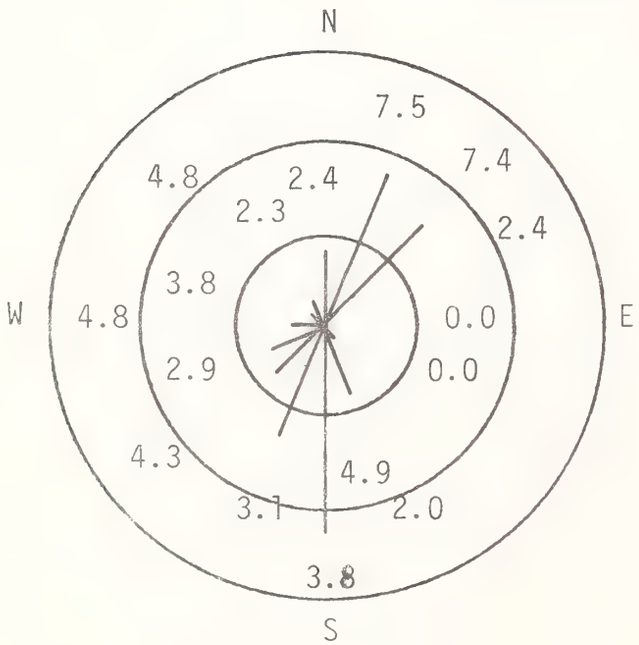


September 1978
Calm 12.9%
(Total Hours 240)

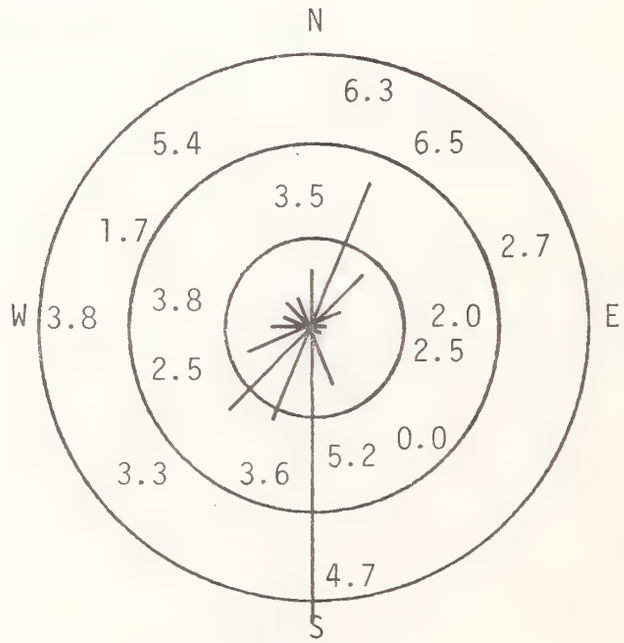


October 1978
Calm 17.3%
(Total Hours 248)

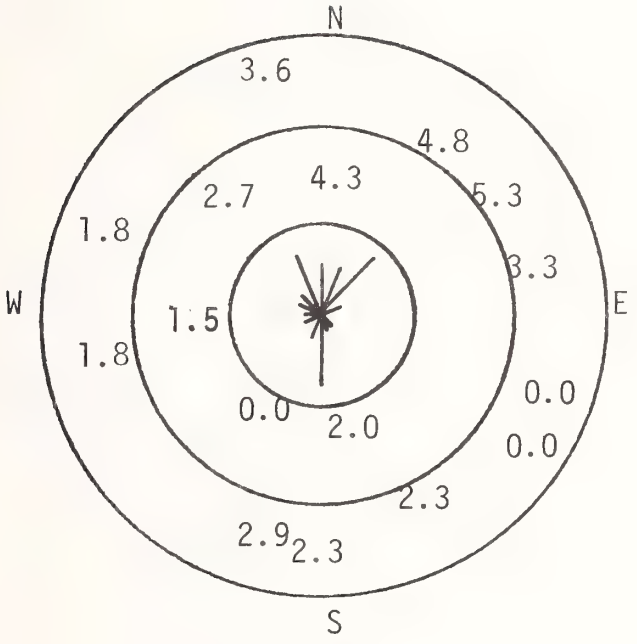
Monthly Wind Roses
National Weather Service
Glacier Park International Airport
Kalispell, Montana



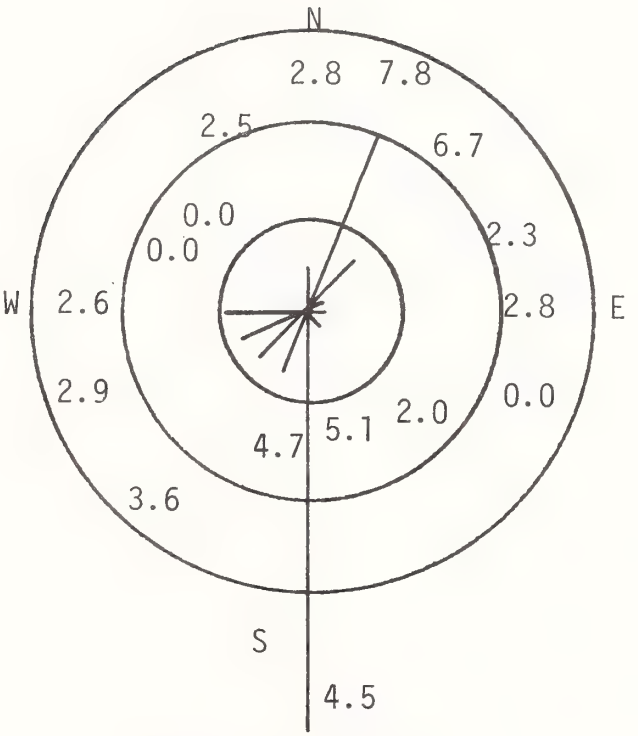
November 1978
Calm 17.9%
(Total Hours 240)



December 1978
Calm 15.3%
(Total Hours 248)

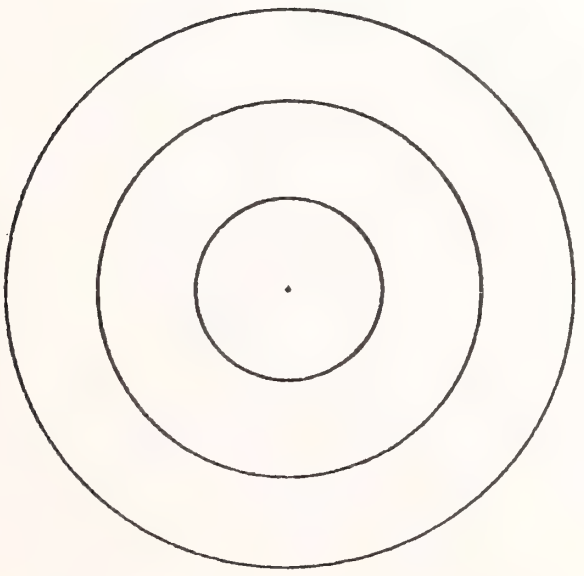


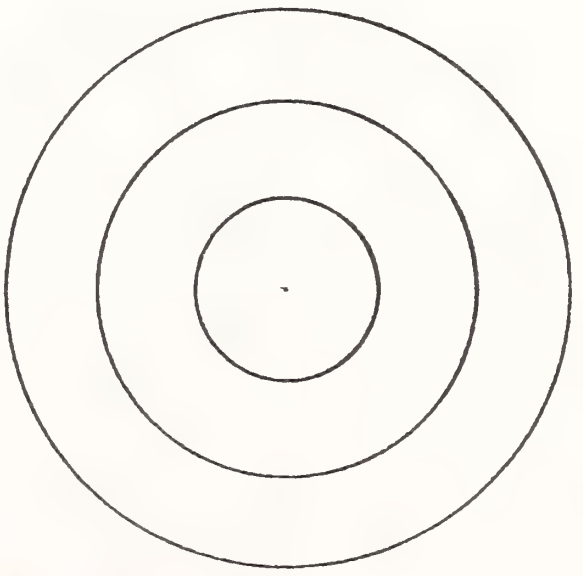
January 1979
Calm 30.7%
(Total Hours 248)

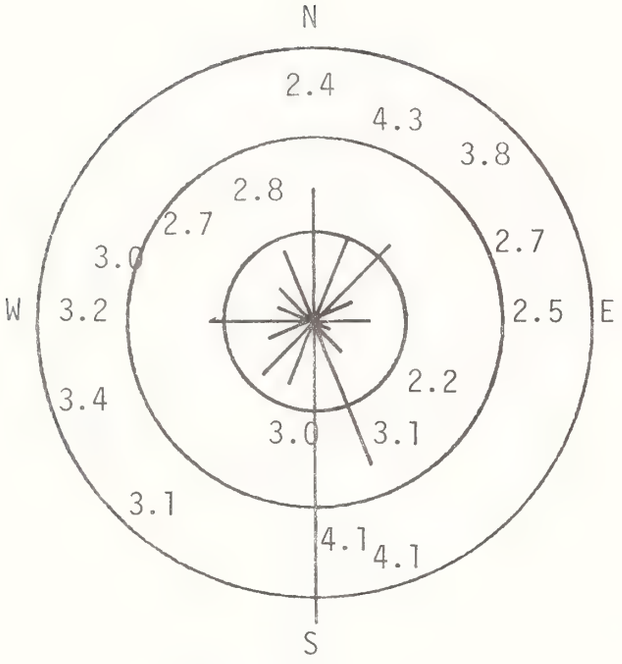


February 1979
Calm 15.2%
(Total Hours 224)

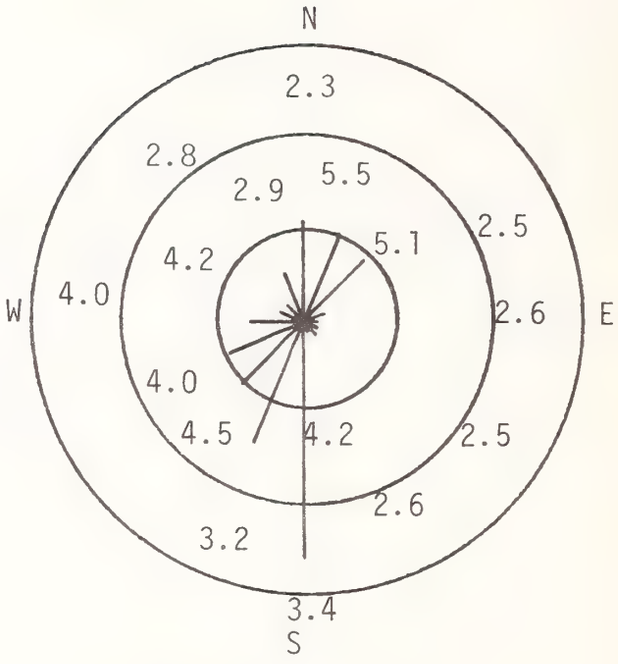
Monthly Wind Roses
National Weather Service
Glacier Park International Airport
Kalispell, Montana





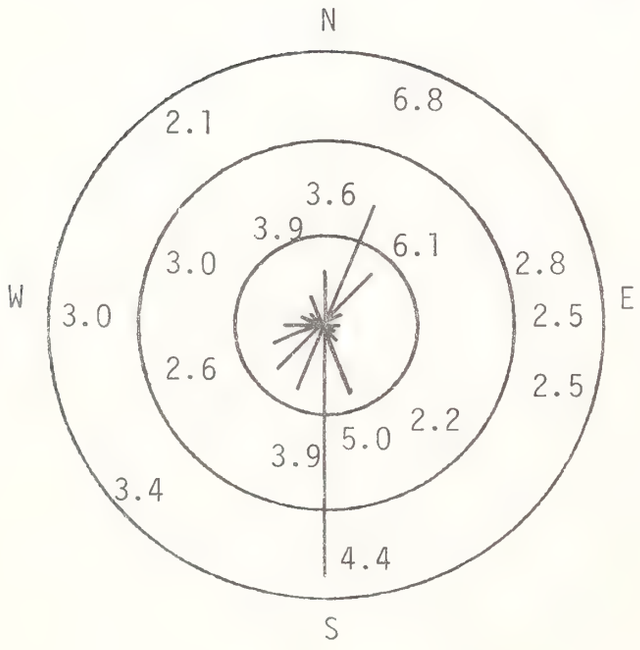


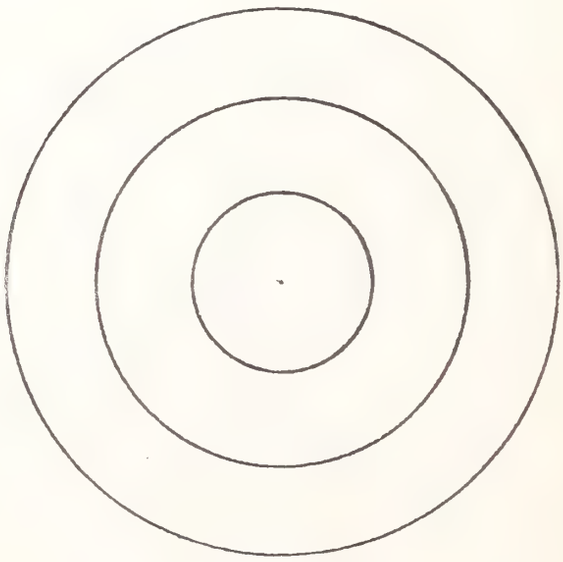
Summer 1978
Calm 8.2%
(Total Hours 736)



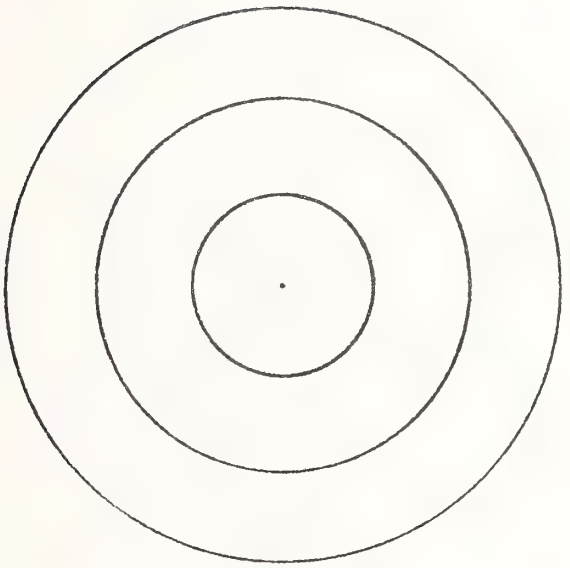
Autumn 1978
Calm 18.6%
(Total Hours 728)

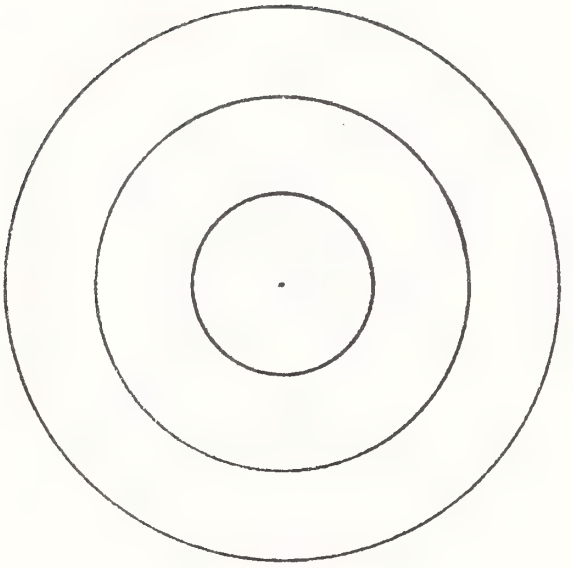
Seasonal Wind Roses
National Weather Service
Glacier Park International Airport
Kalispell, Montana



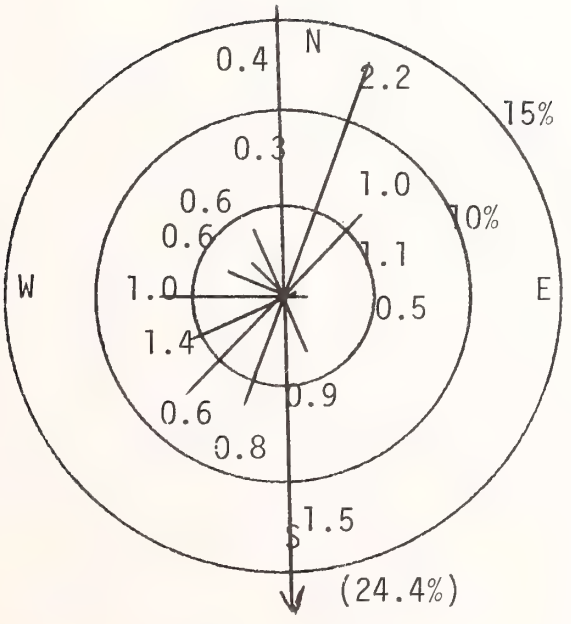


Winter 1978-1979
Calm 20.6%
(Total Hours 720)

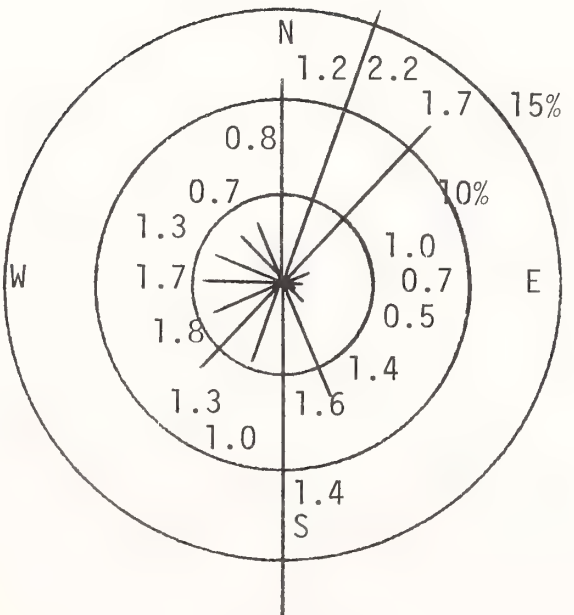




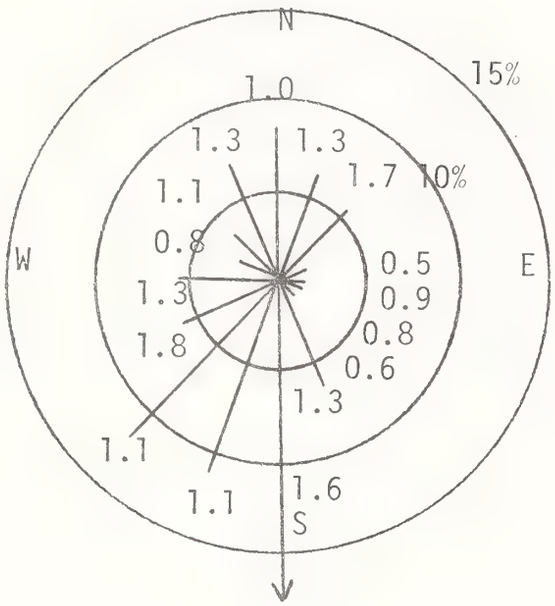
Monthly Wind Roses
Brant Site
Kalispell, Montana



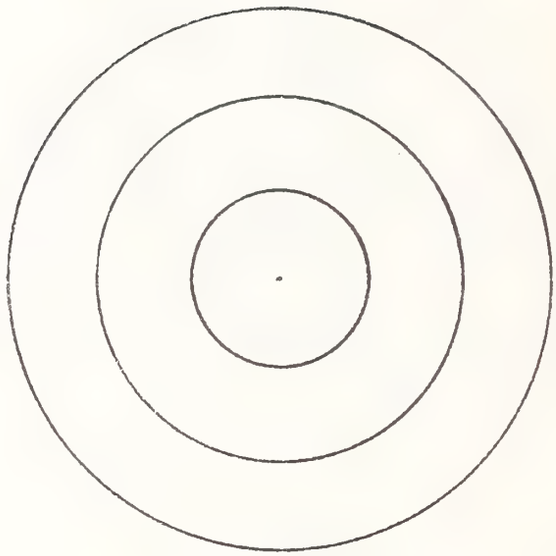
March 1978
Calm 3.7%
(Total Hours 323)



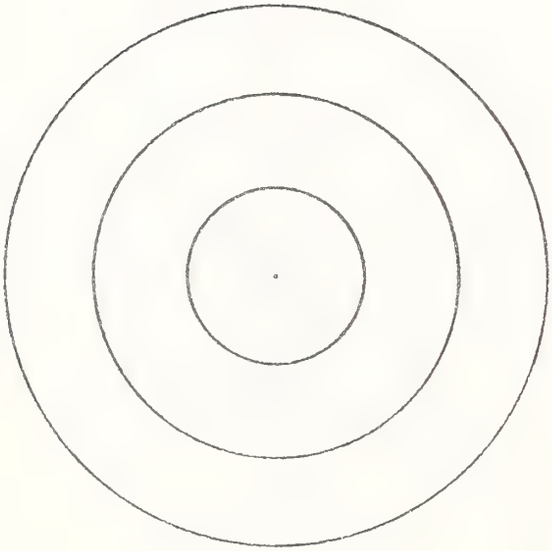
April 1978
Calm 0.9%
(Total Hours 688)

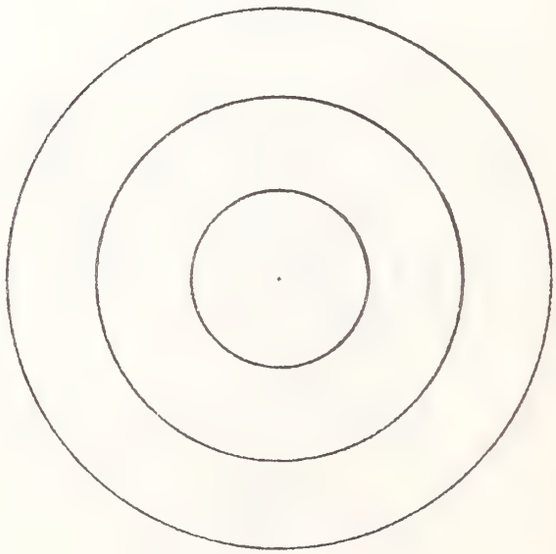


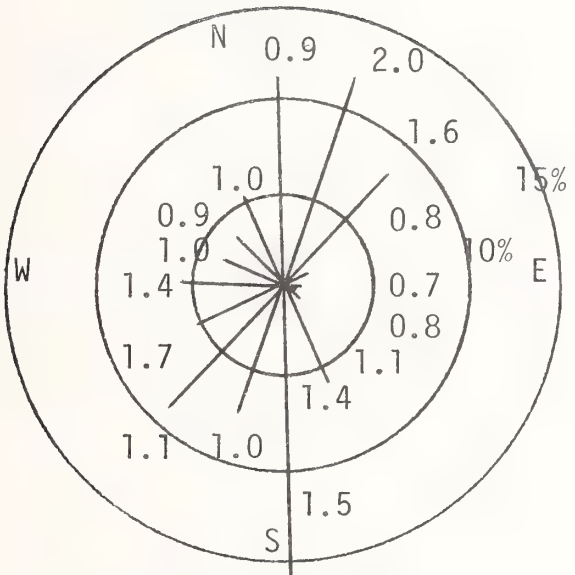
May 1978
Calm 0.9%
(Total Hours 682)



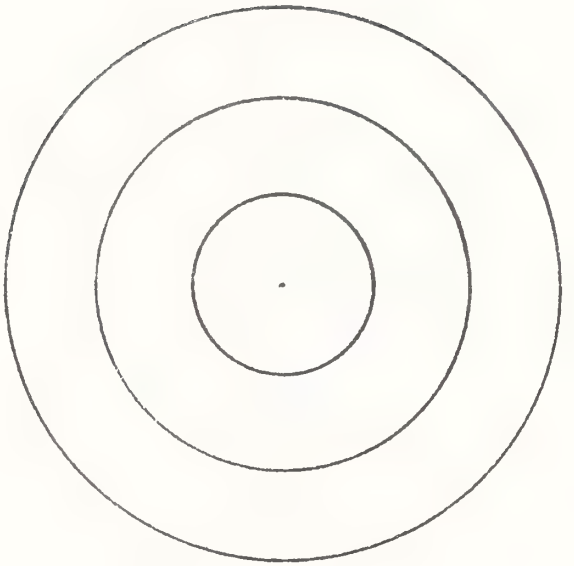
Monthly Wind Roses
Brand Site
Kalispell, Montana



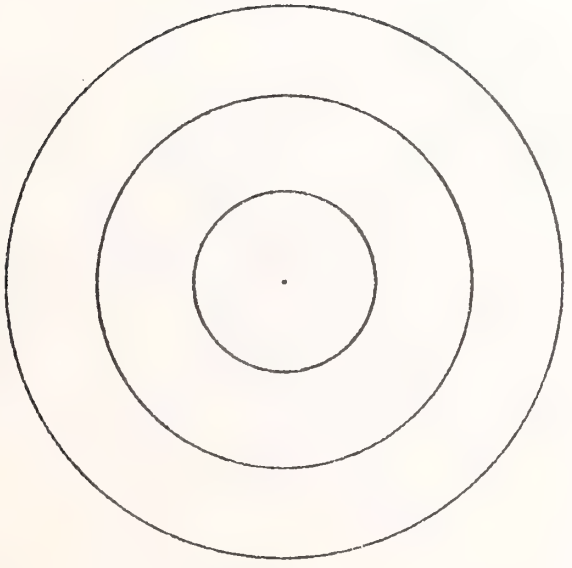


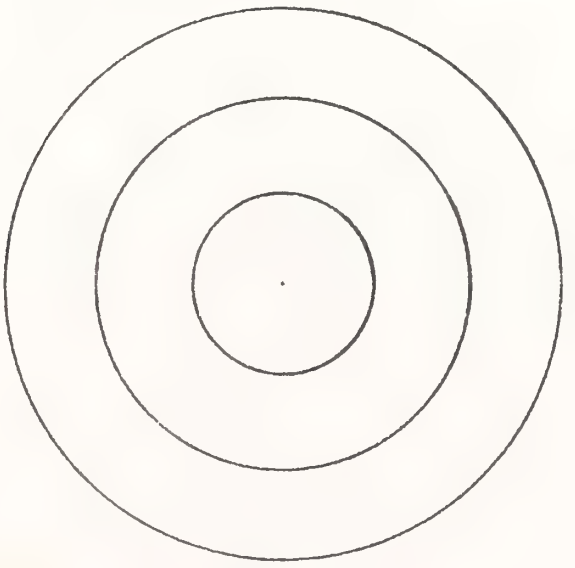


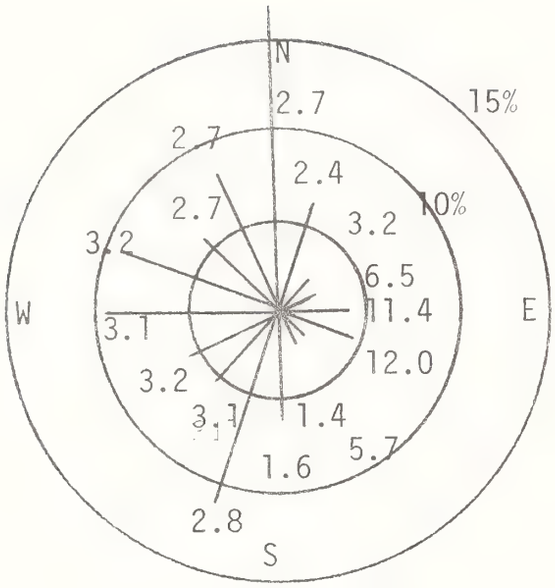
Spring 1978
Calm 1.4%
(Total Hours 1693)



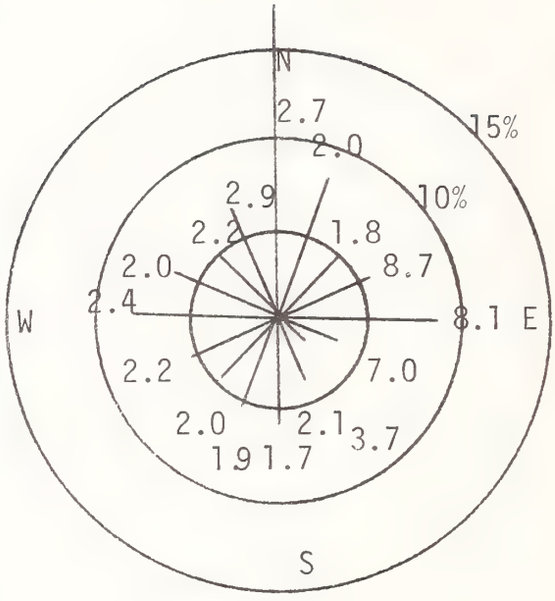
Seasonal Wind Roses
Brant Site
Kalispell, Montana





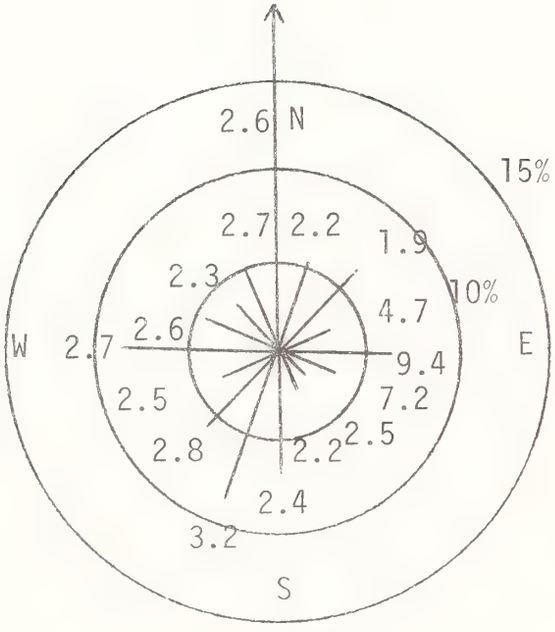


January 1978
Calm 0.0%
(total hours 729)

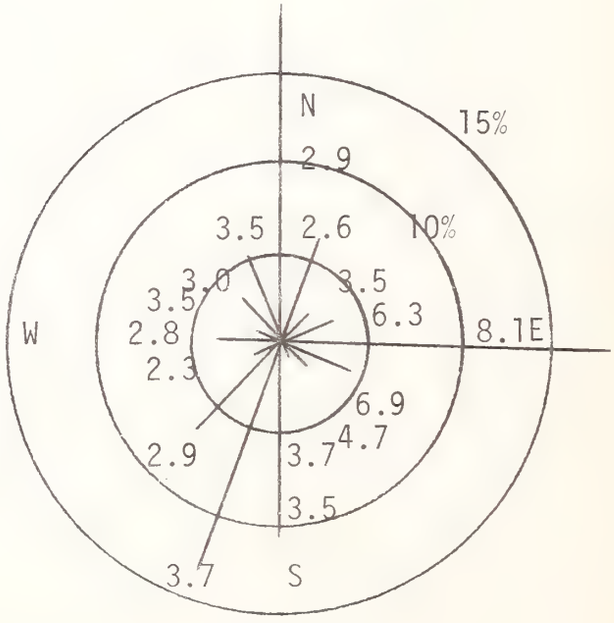


February 1978
Calm 0.0%
(total hours 402)

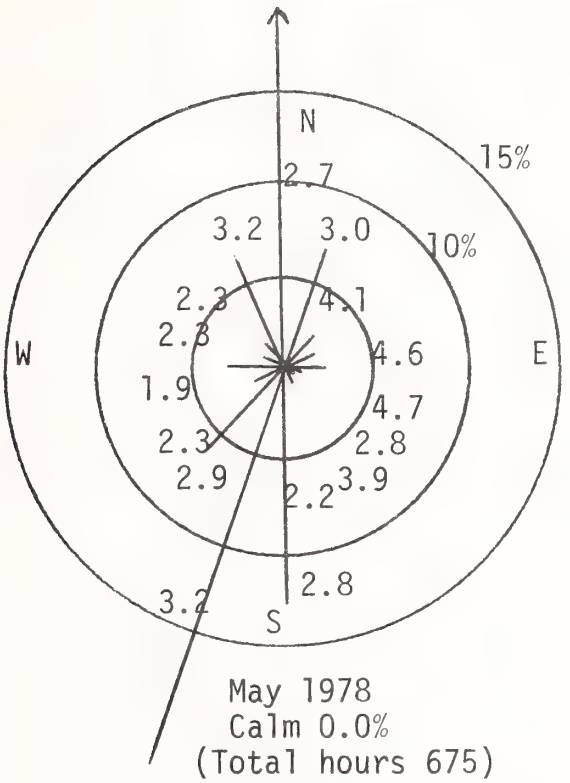
Monthly Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana



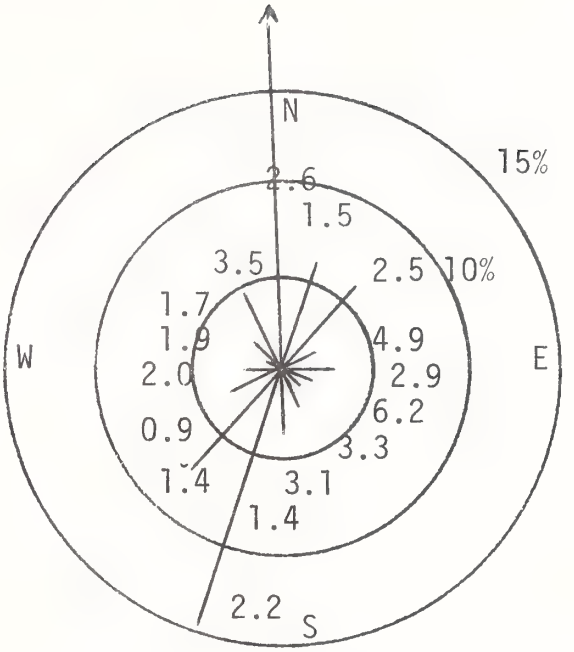
March 1978
Calm 0.0%
(total hours 716)



April 1978
Calm 0.0%
(total hours 693)

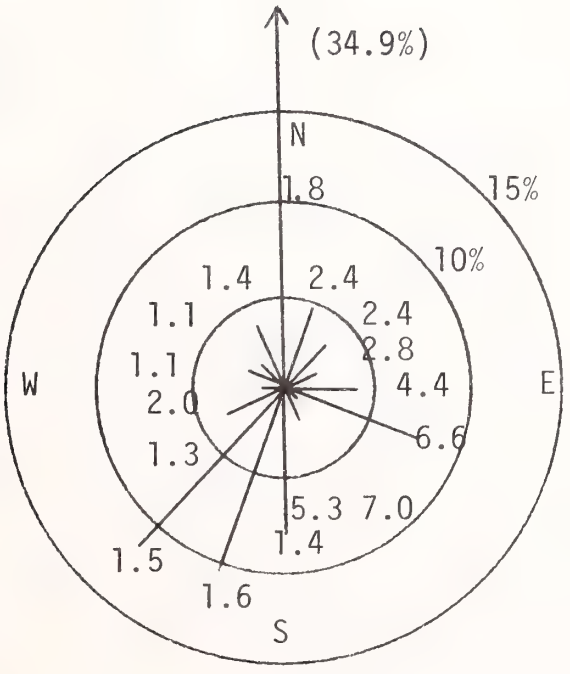


May 1978
Calm 0.0%
(Total hours 675)

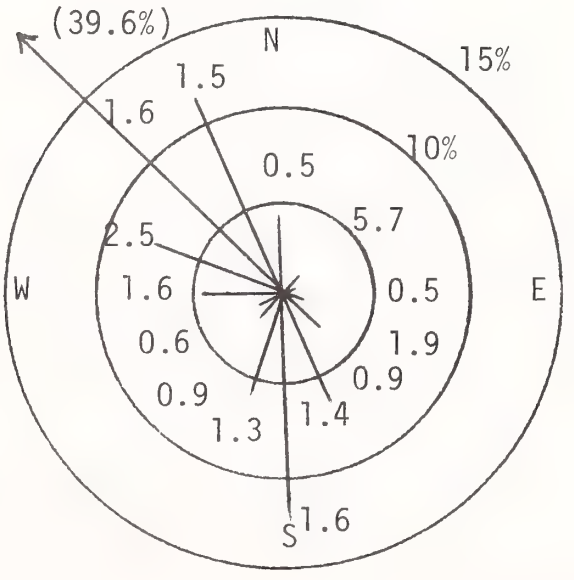


June 1978
Calm 5.8%
(total hours 308)

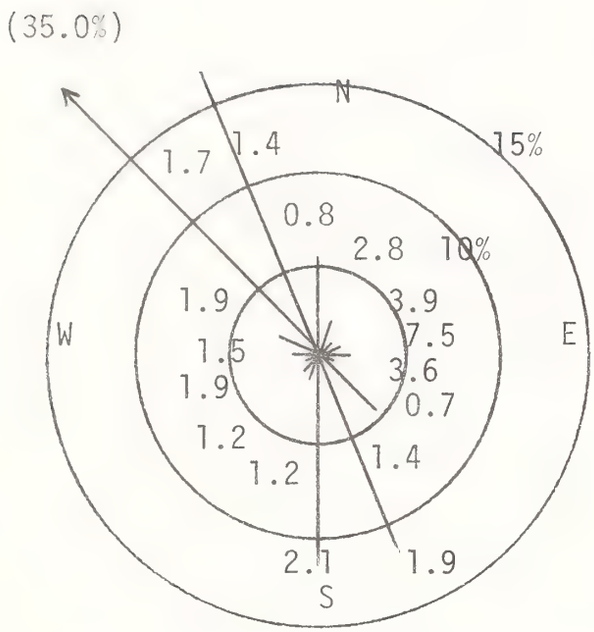
Monthly Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana



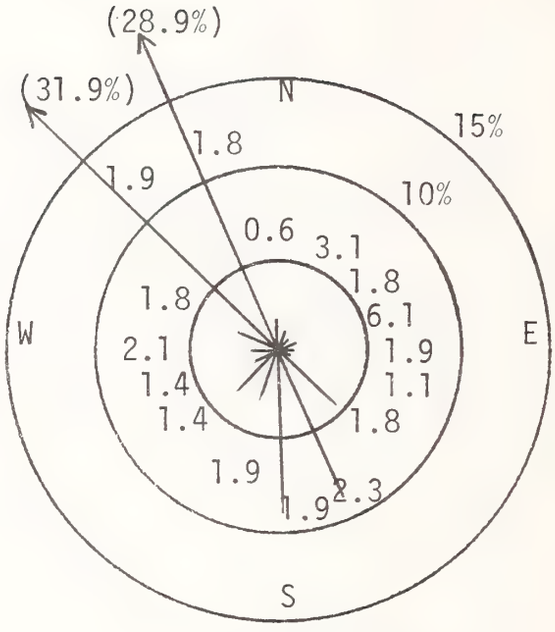
July 1978
Calm 0.0%
(total Hours 186)



August 1978
Calm 0.0%
(Total Hours 187)

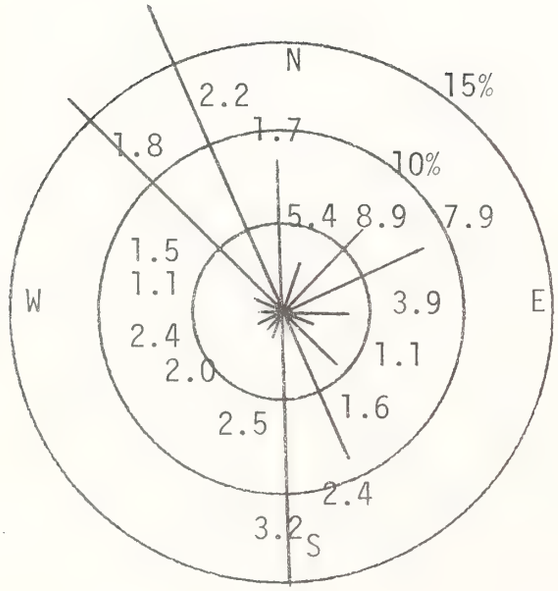


September 1978
Calm 0.0%
(total hours 703)

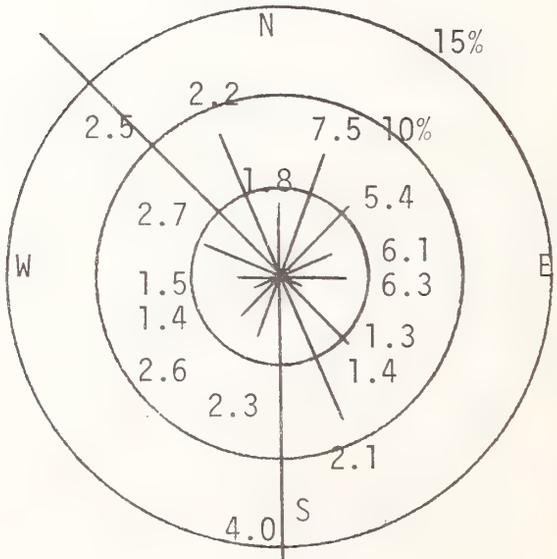


October 1978
Calm 0.0%
(total hours 732)

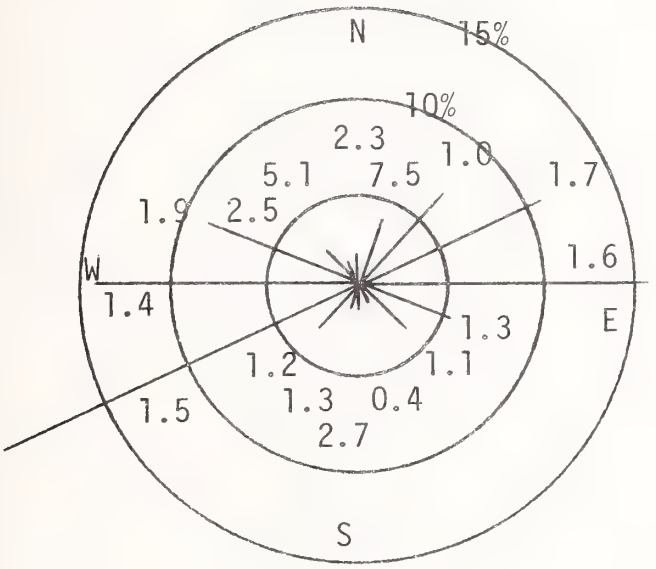
Monthly Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana



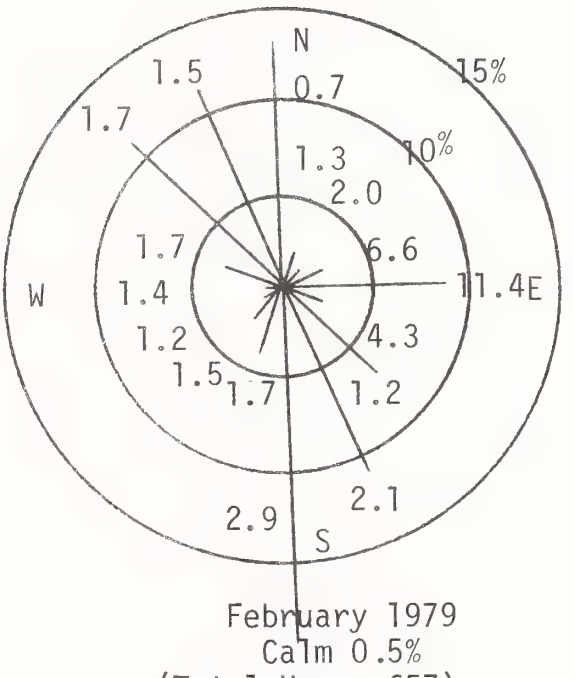
November 1978
Calm 0.0%
(Total Hours 545)



December 1978
Calm 0.0%
(total hours 213)

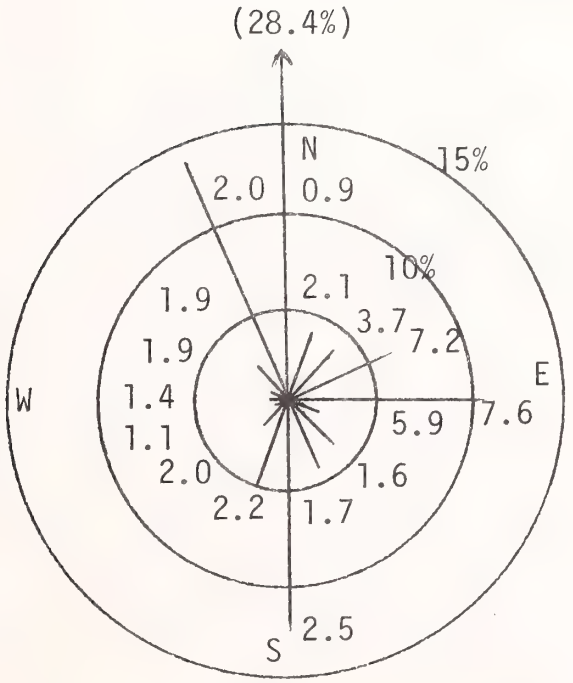


January 1979
Calm 0.2%
(Total Hours 564)

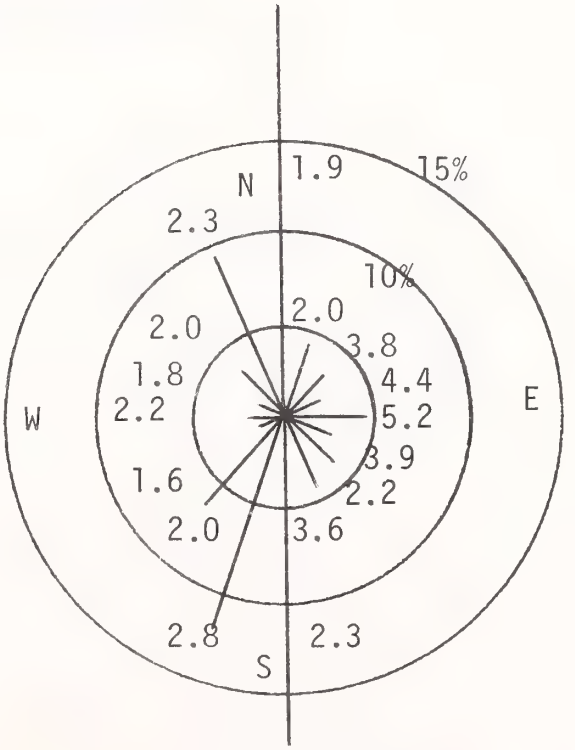


February 1979
Calm 0.5%
(Total Hours 657)

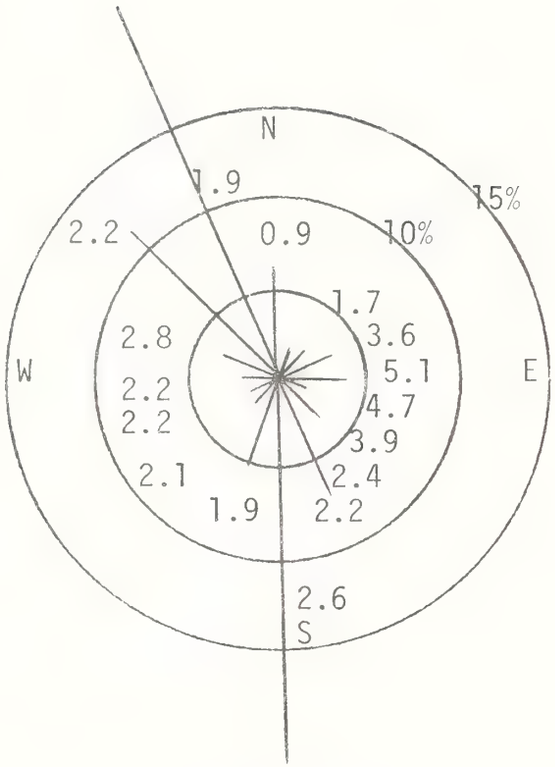
Monthly Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana



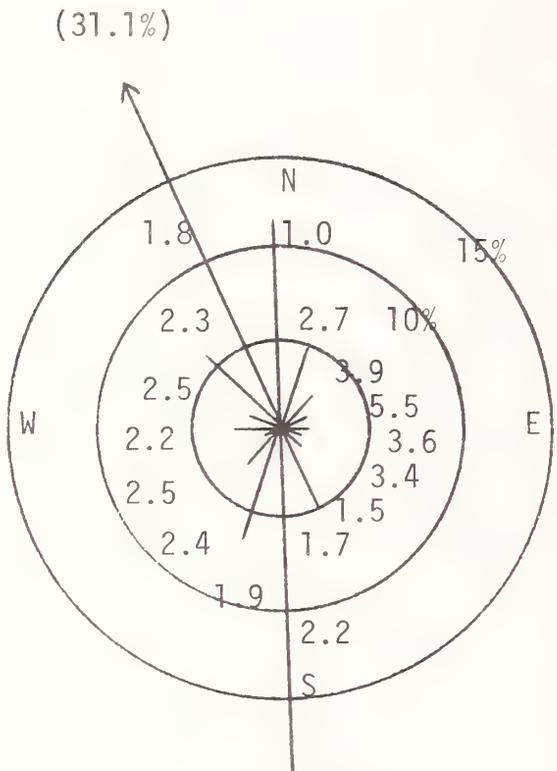
March 1979
Calm 0.1%
(Total Hours 731)



April 1979
Calm 1.7%
(Total Hours 693)

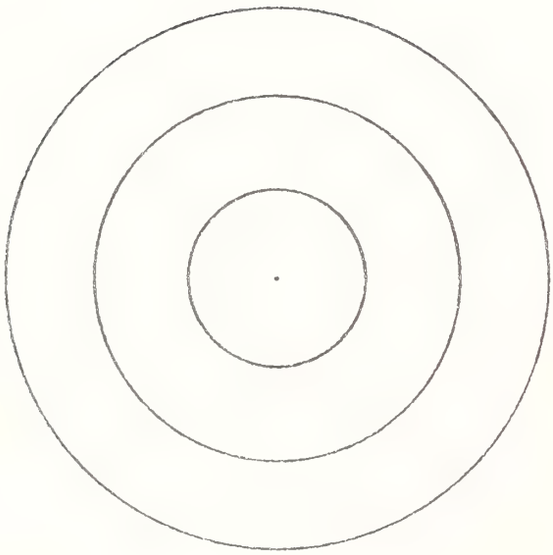


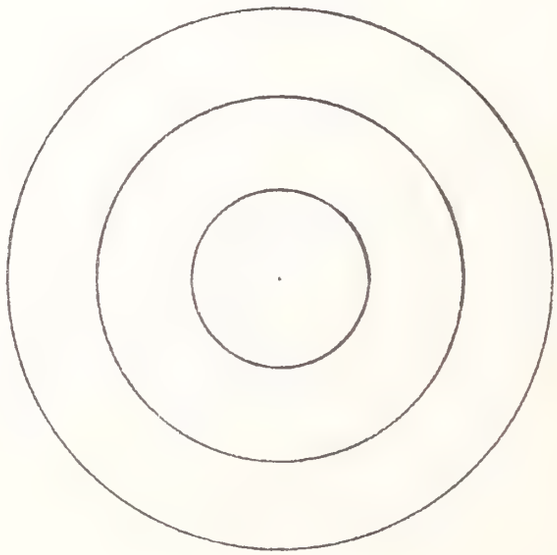
May 1979
Calm 1.4%
(Total Hours 720)

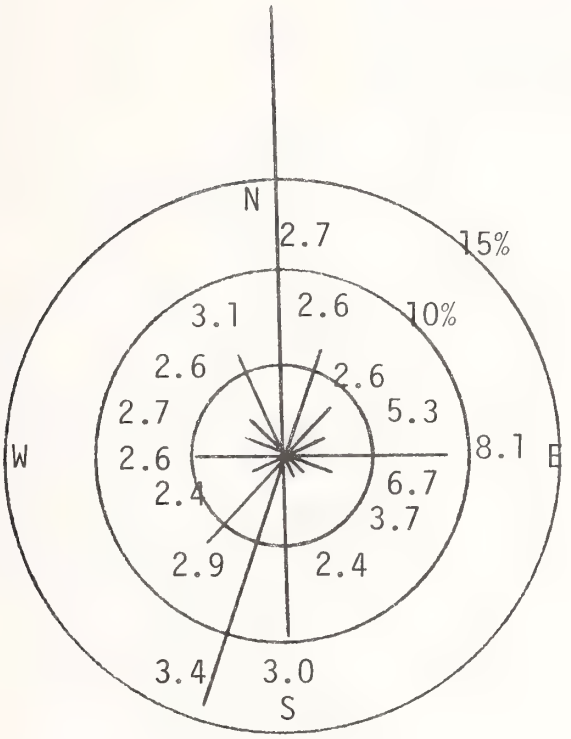


June 1979
Calm 1.3%
(Total Hours 699)

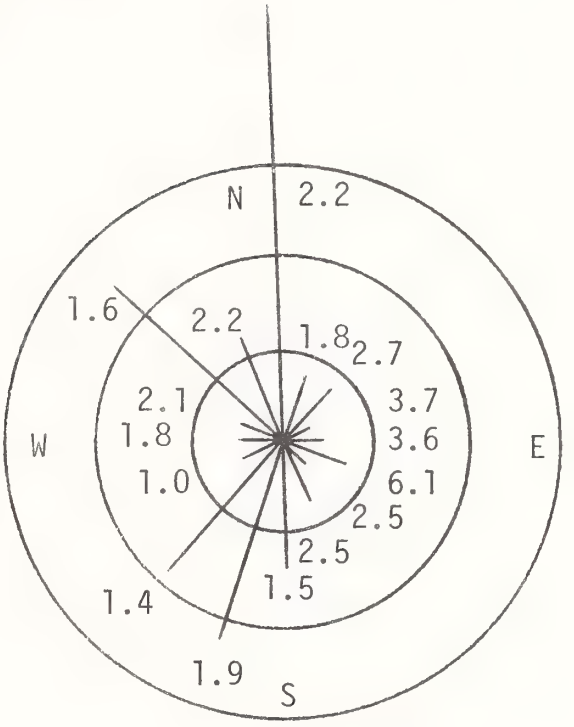
Monthly Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana





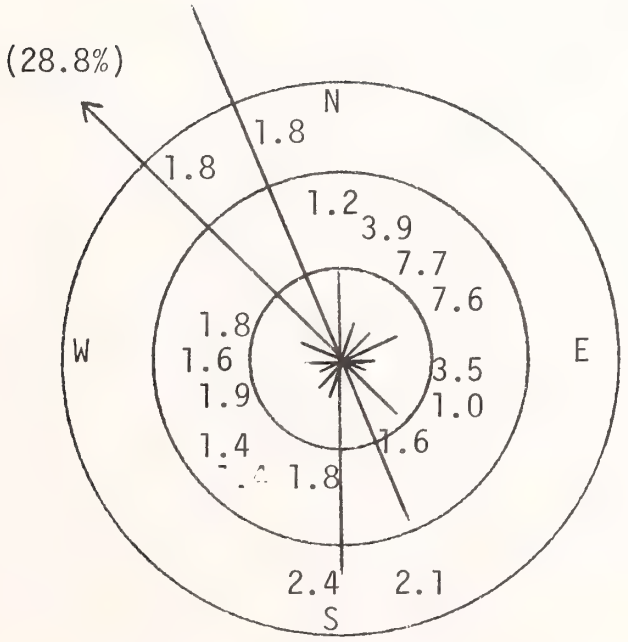


Spring 1978
Calm 0.0%
(Total Hours 2084)

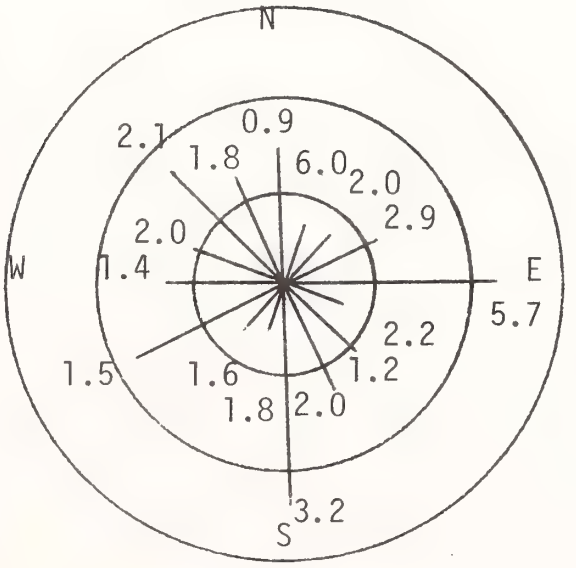


Summer 1978
Calm 2.6%
(Total Hours 681)

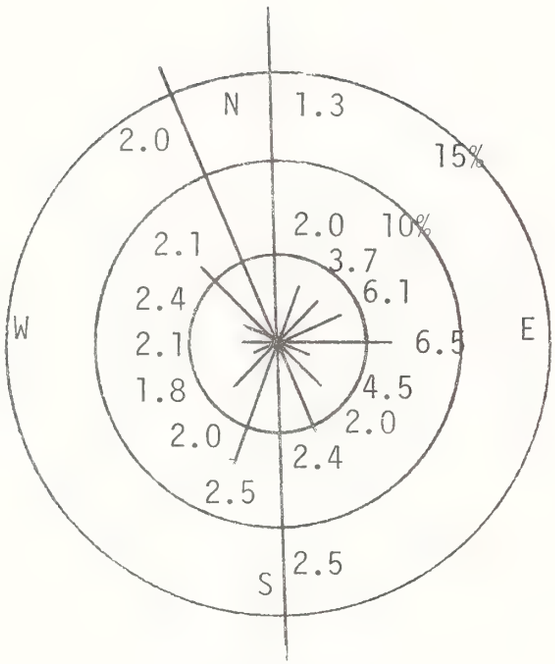
Seasonal Wind Roses
Teakettle Mountain Site
Columbia Falls, Montana



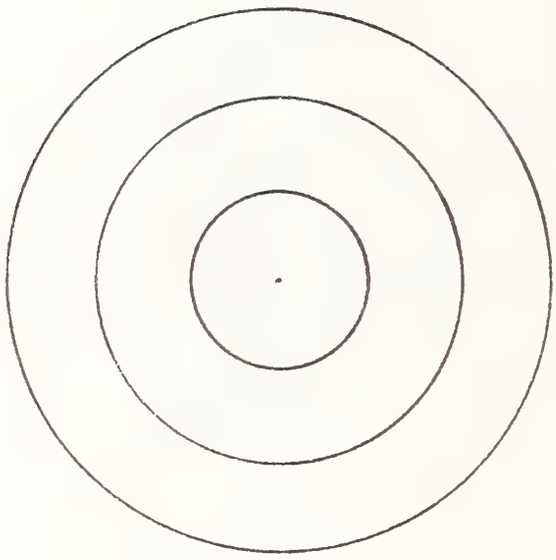
Autumn 1978
Calm 0.0%
(Total Hours 1980)



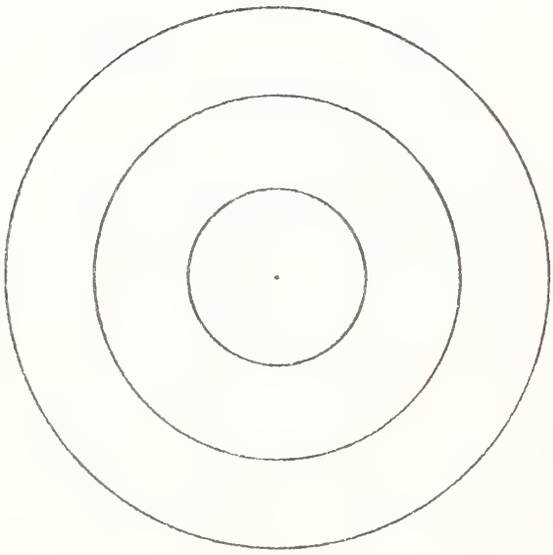
Winter 1978-79
Calm 0.3%
(Total Hours 1434)

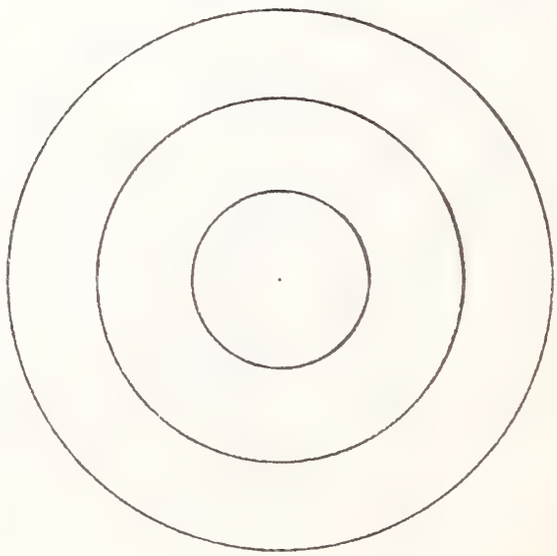


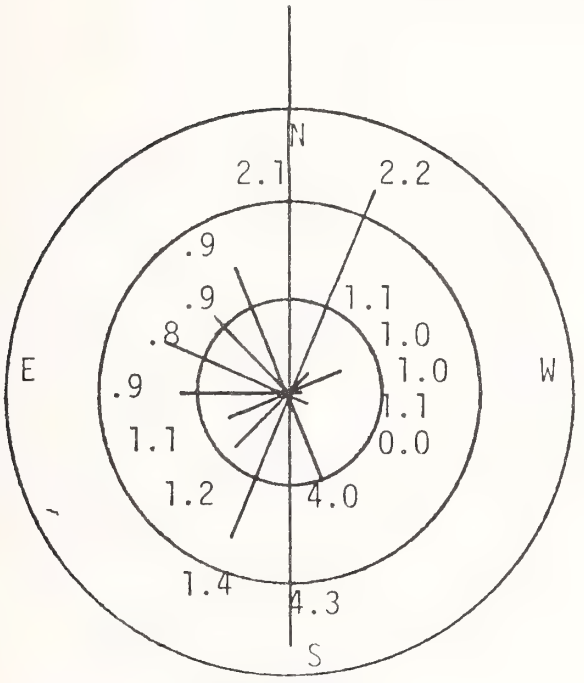
Spring 1979
Calm 1.1%
(Total Hours 2144)



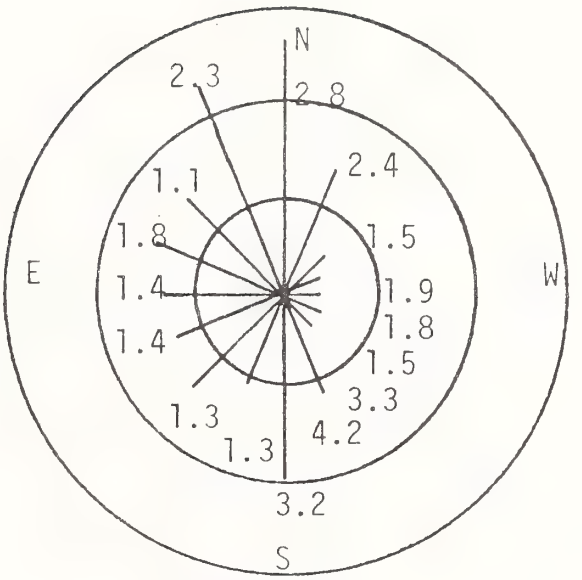
Seasonal Wind Roses
Teakettle Mountain Site
Columbai Falls, Montana





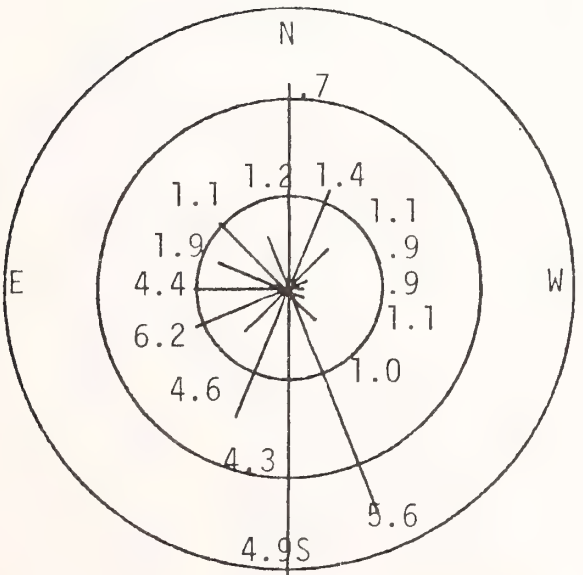


January 1978
Calm 0%
(Total Hours 301)

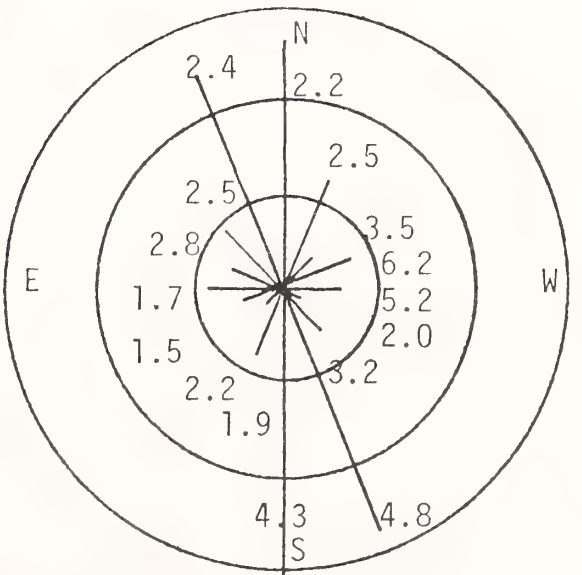


February 1978
Calm 0%
(Total Hours 574)

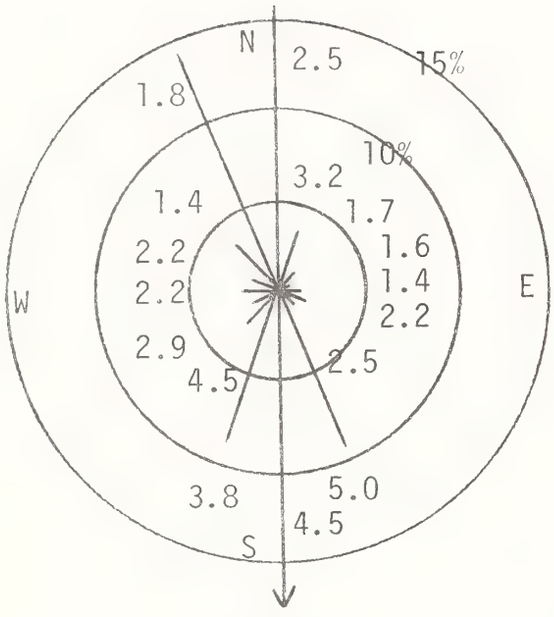
Monthly Wind Roses
GEIS Site
Columbia Falls, Montana

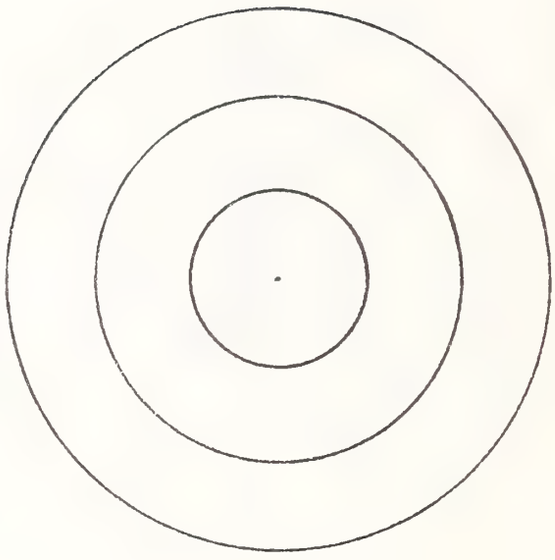


March 1978
Calm 0%
(Total Hours 220)



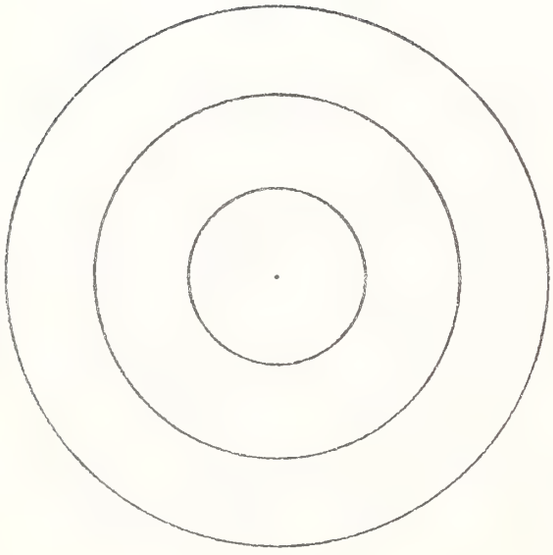
April 1978
Calm 0%
(Total Hours 312)

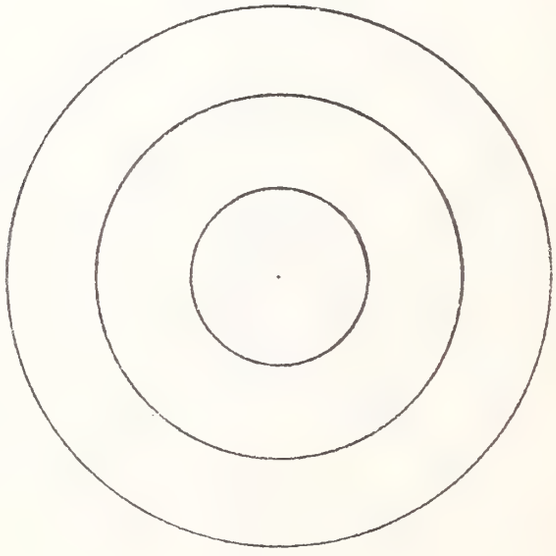


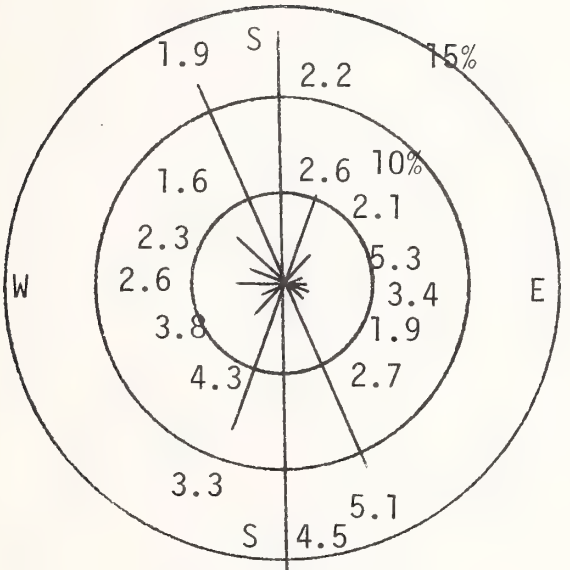


May 1978
Calm 0.0%
(Total Hours 697)

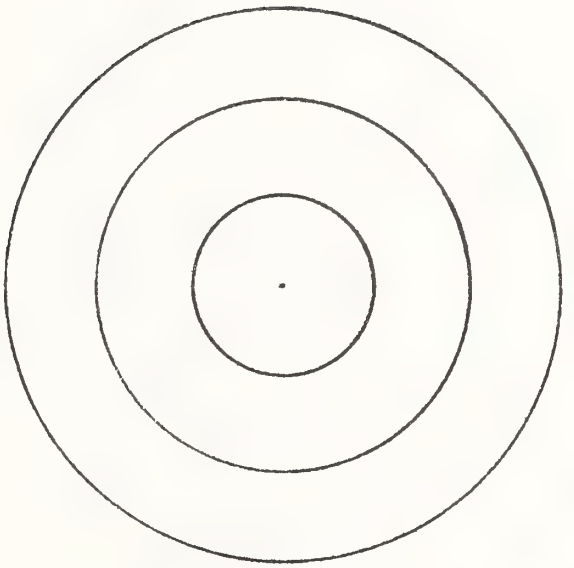
Monthly Wind Roses
Geis Site
Columbia Falls, MT



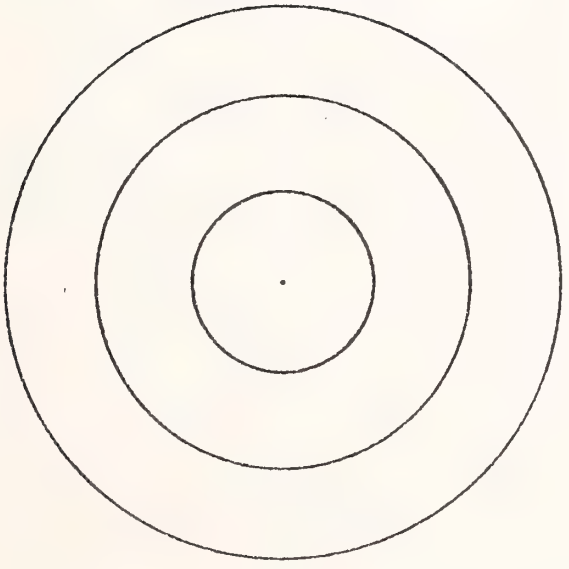


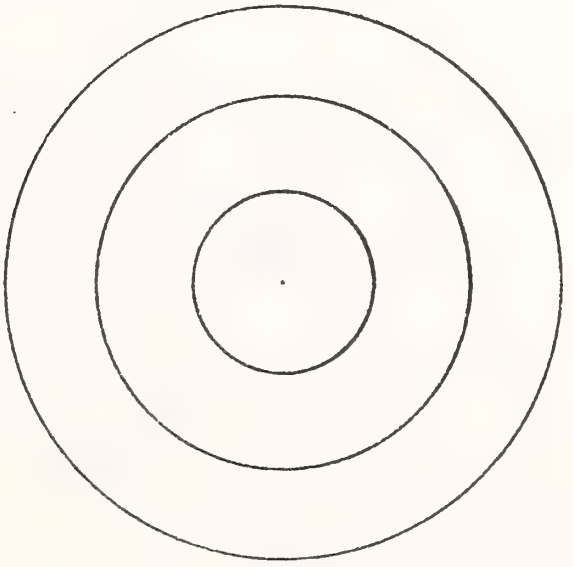


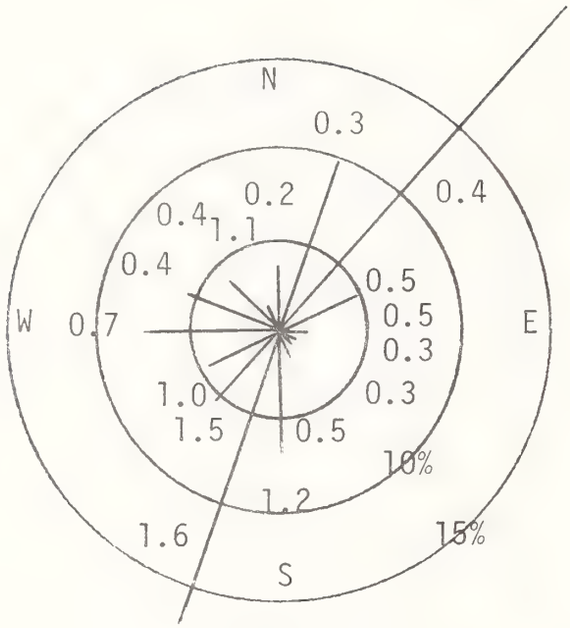
Spring 1978
Calm 0.0%
(Total Hours 1229)



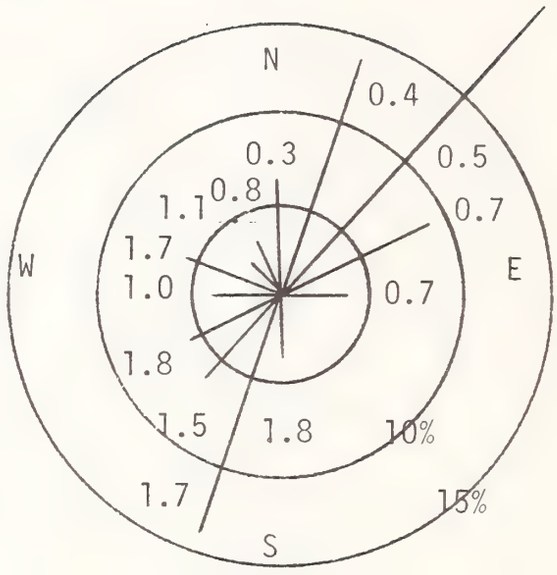
Seasonal Wind Roses
Geis Site
Columbia Falls, MT





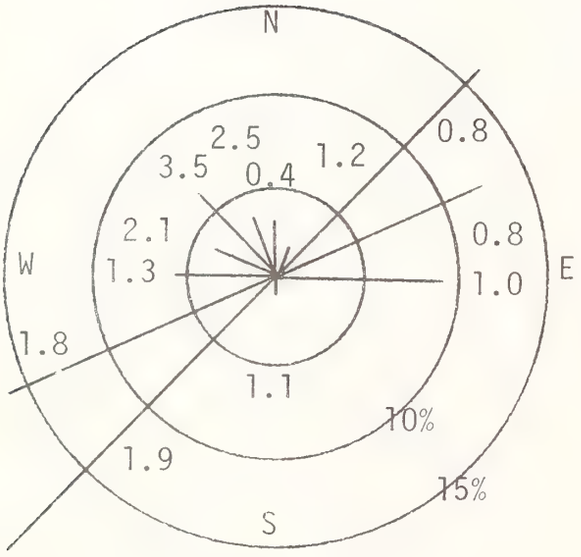


September 1978
Calm 0.4%
(Total Hours 233)

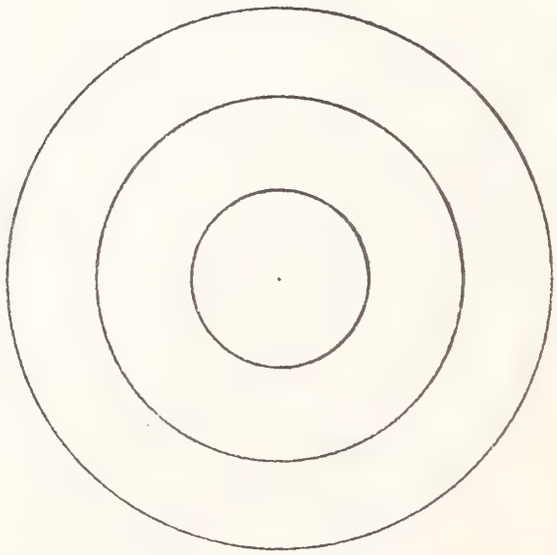


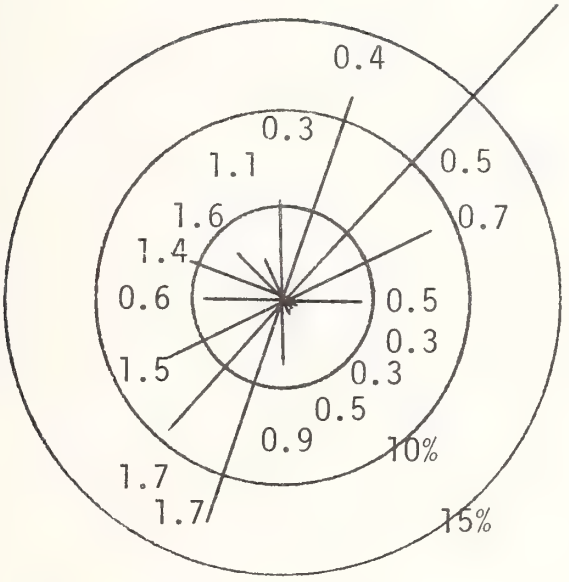
October 1978
Calm 3.4%
(Total Hours 498)

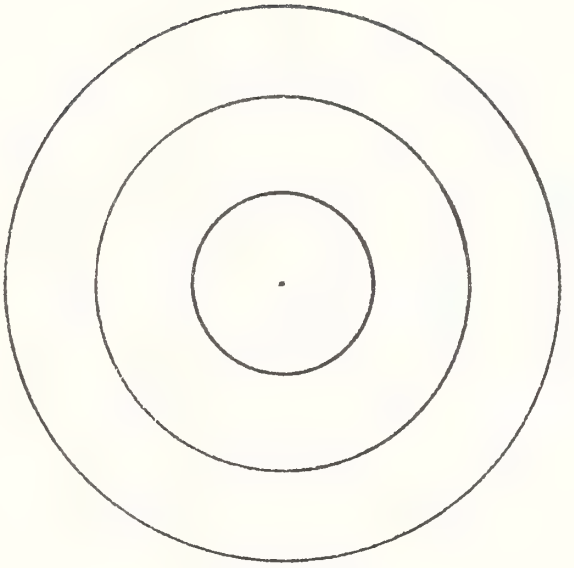
Monthly Wind Roses
Polebridge Ranger Station
Polebridge, MT



November 1978
Calm 0.0%
(Total Hours 144)

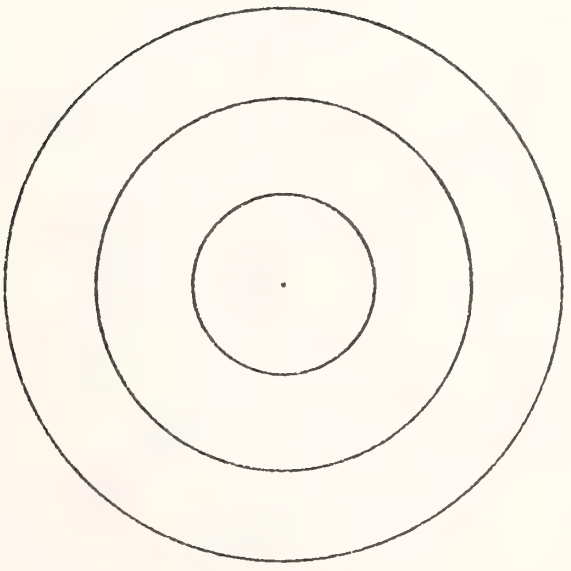


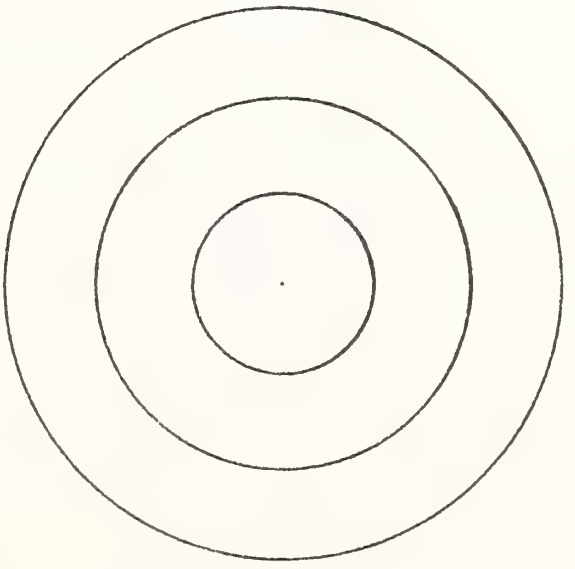


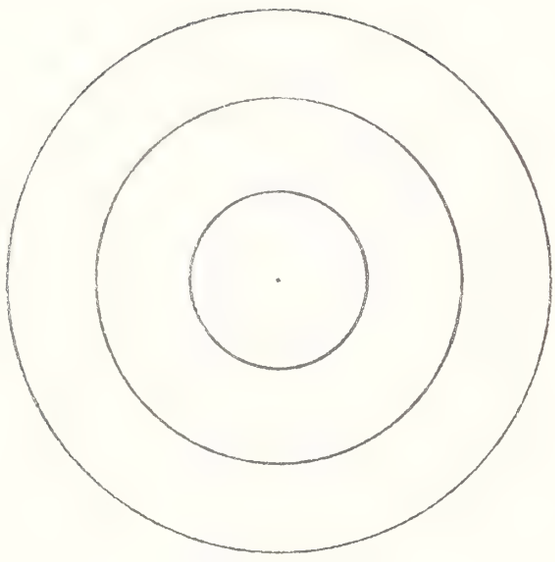


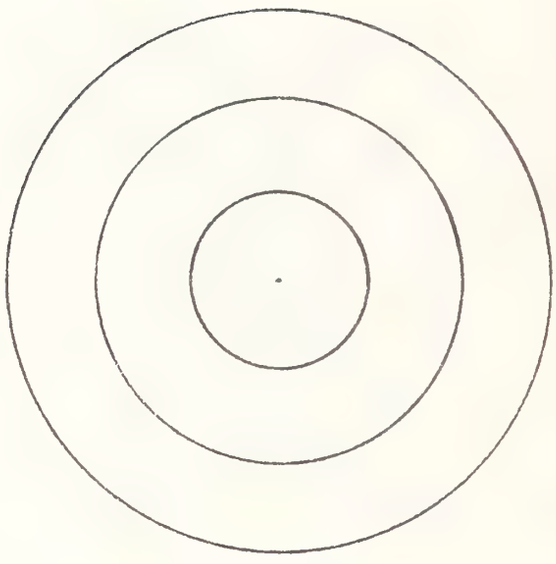
Autumn 1978
Calm 2.1%
(Total Hours 875)

Seasonal Wind Roses
Polebridge Ranger Station
Polebridge, Montana

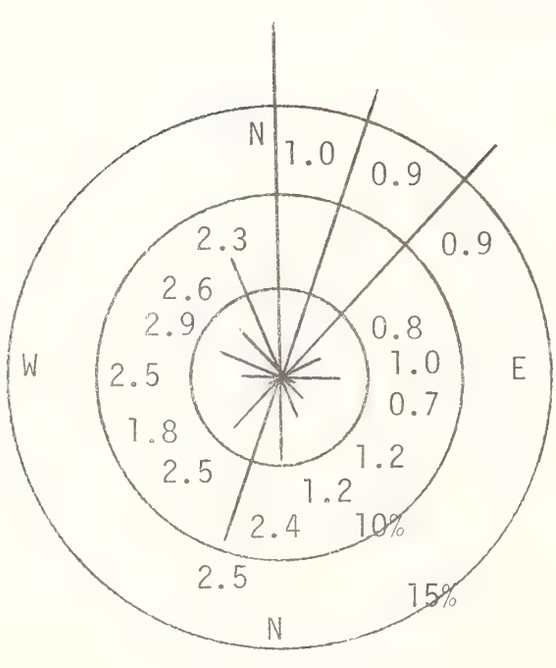




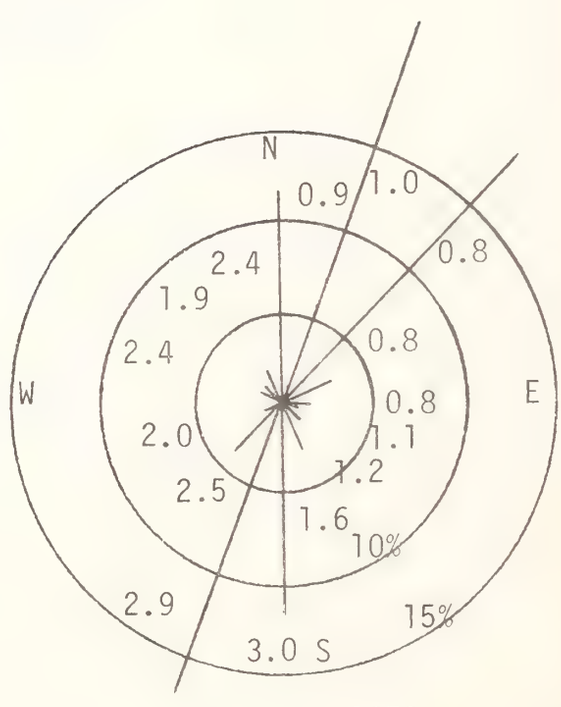




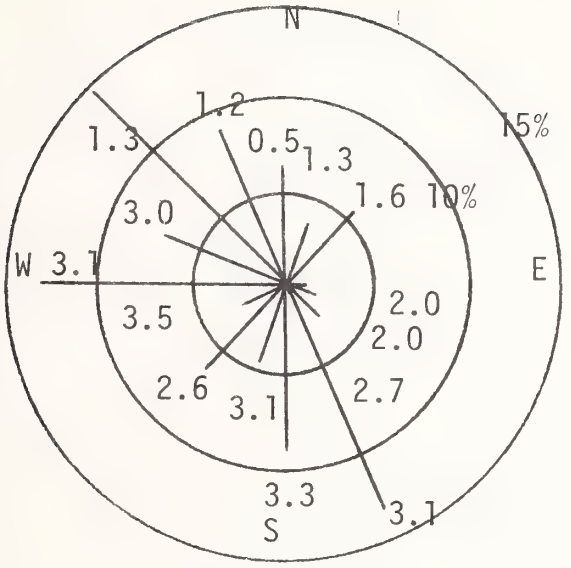
Montly Wind Roses
Big Prairie Site
Polebridge, MT



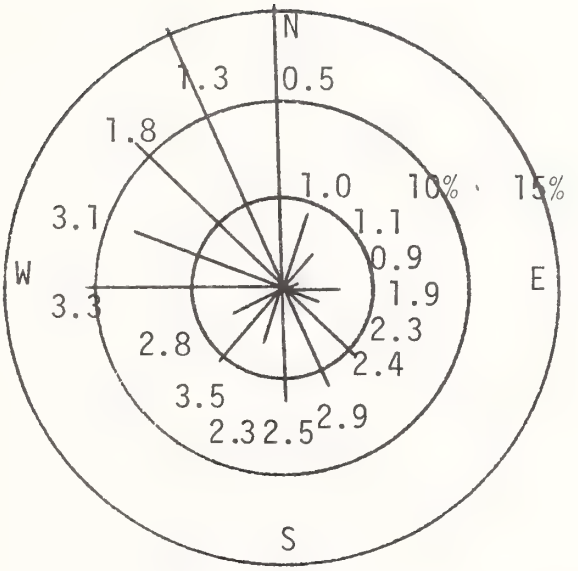
November 1978
Calm 0.0%
(Total Hours 482)



December 1978
Calm 0.0%
(Total Hours 228)

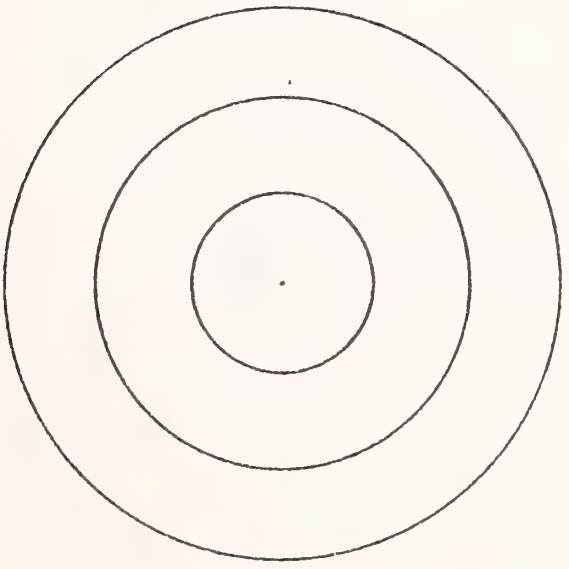


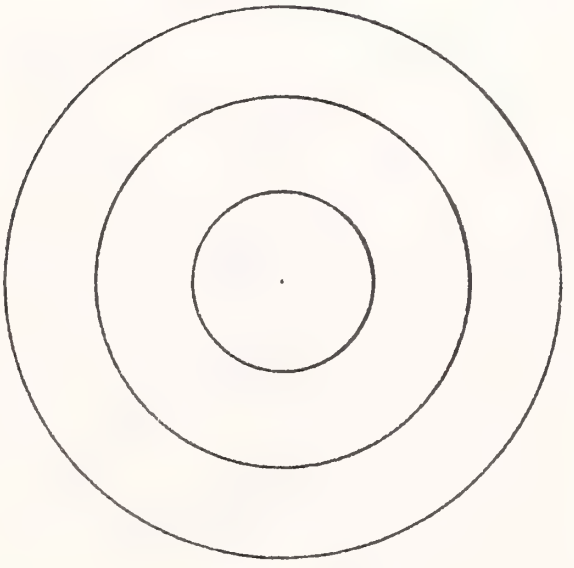
May 1979
Calm 8.8%
(total Hours 114)

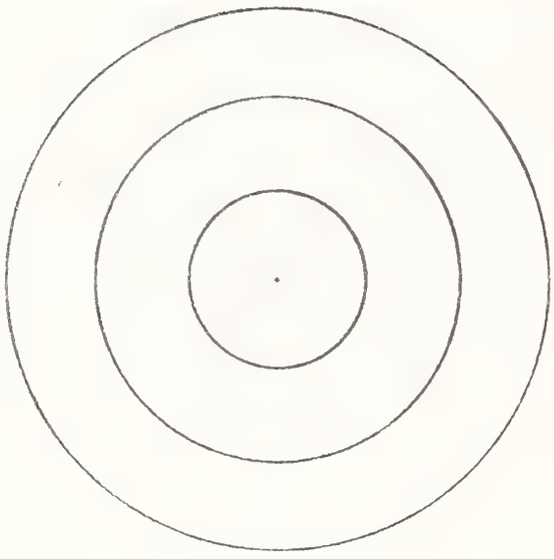


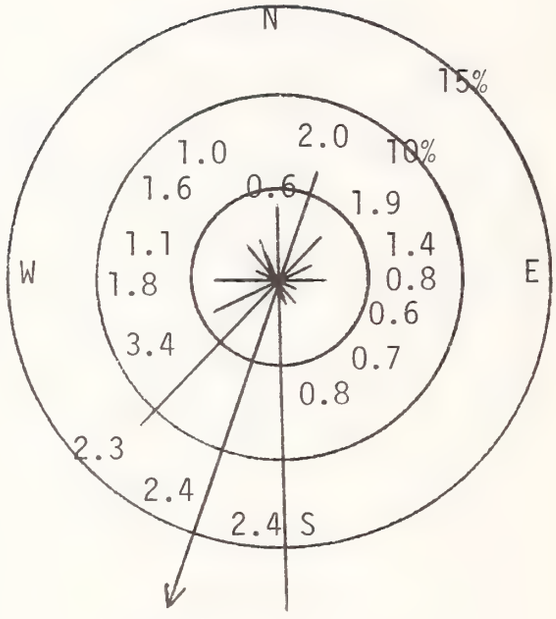
June 1979
Calm 6.2%
(total hours 356)

Monthly Wind Roses
Big Prairie Site
Polebridge, Montana



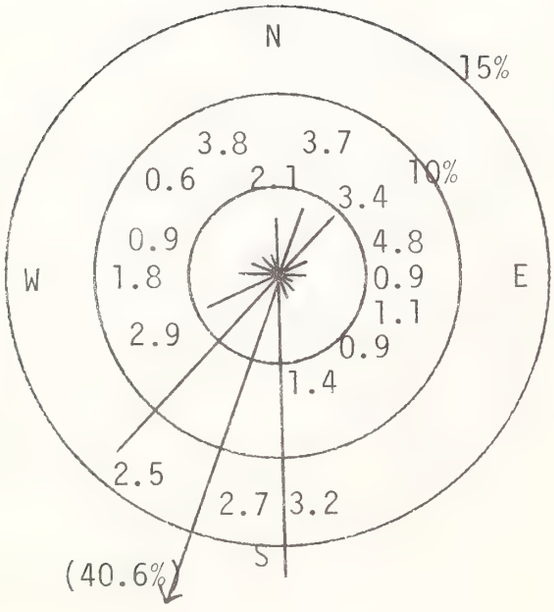




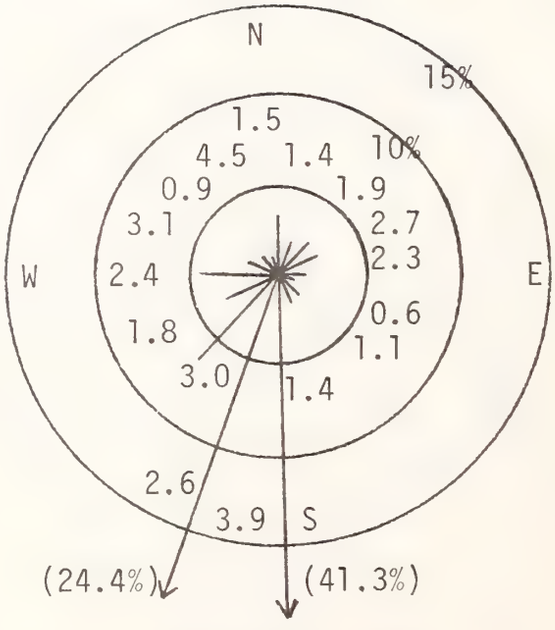


October 1978
Calm 0.0%
(Total Hours 288)

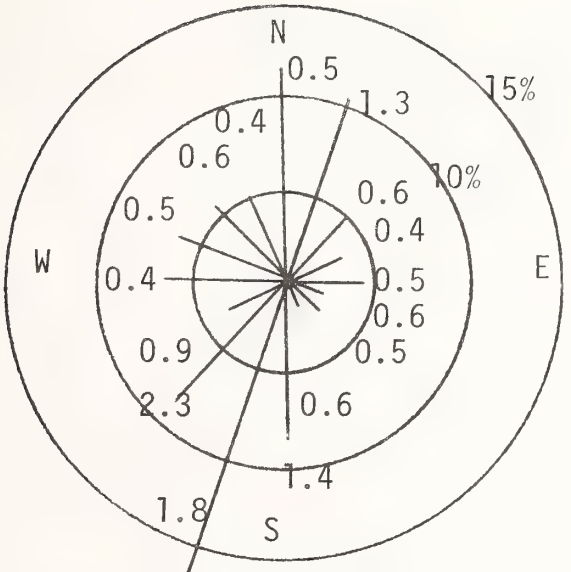
Monthly Wind Roses
Big Sky Stables
Polson, Montana



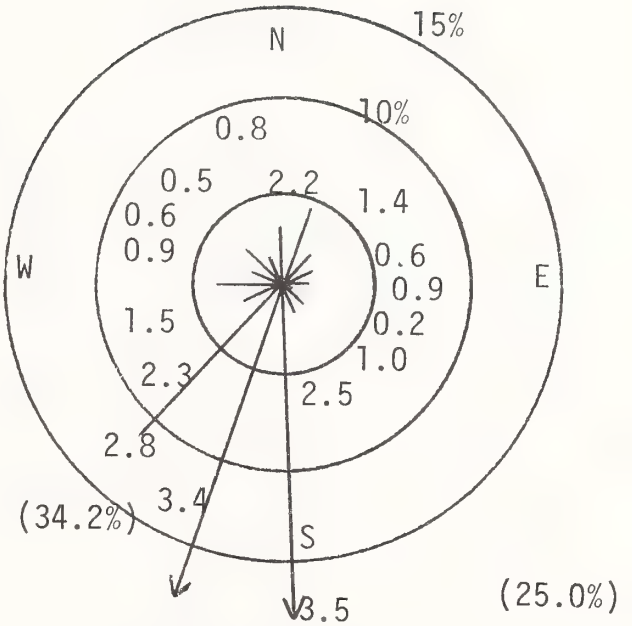
November 1978
Calm 0.0%
(Total Hours 689)



December 1978
Calm 0.0%
(Total Hours 364)

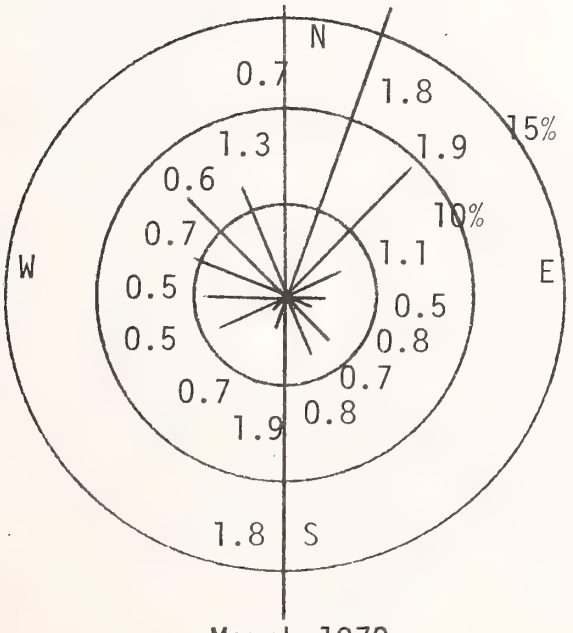


January 1979
Calm 5.0%
(Total Hours 539)

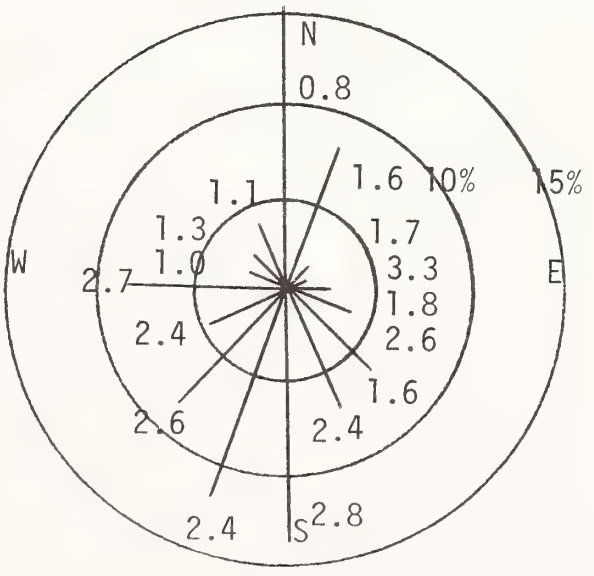


February 1979
Calm 1.1%
(Total Hours 464)

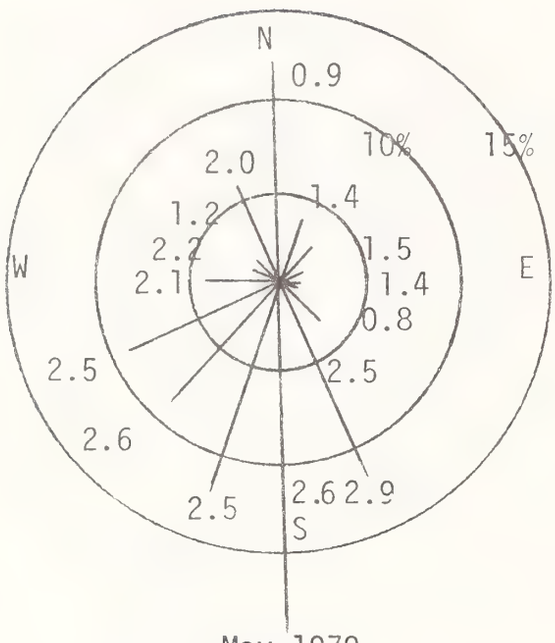
Monthly Wind Roses
Big Sky Stables
Polson, Montana



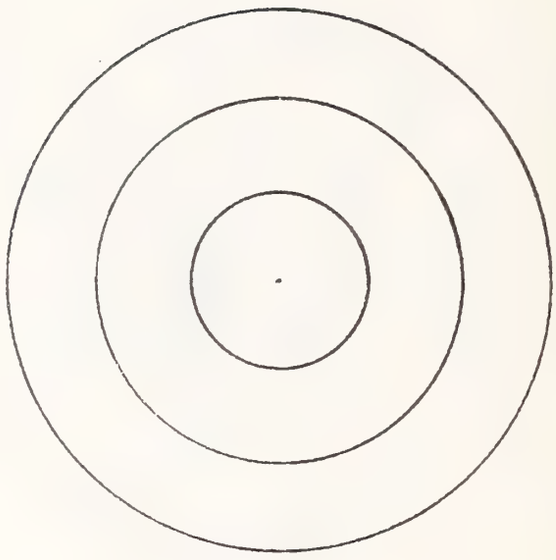
March 1979
Calm 15.9%
(Total Hours 176)



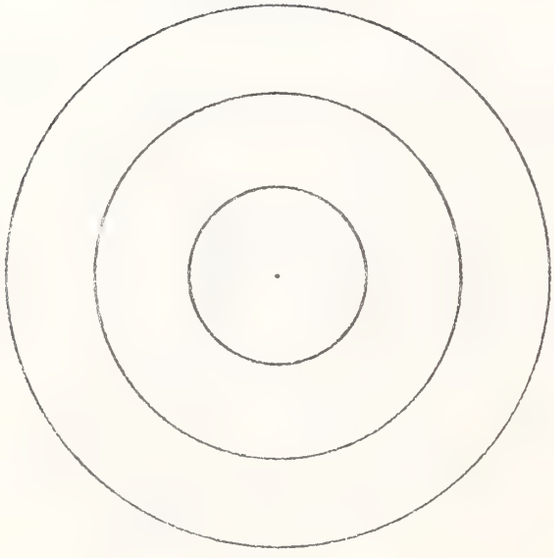
April 1979
Calm 0.4%
(Total Hours 246)

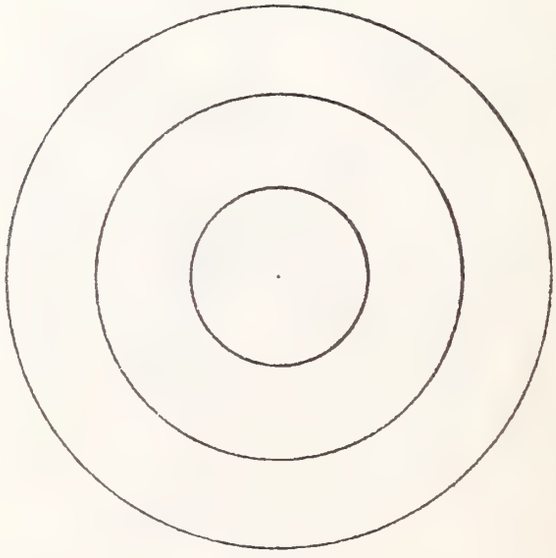


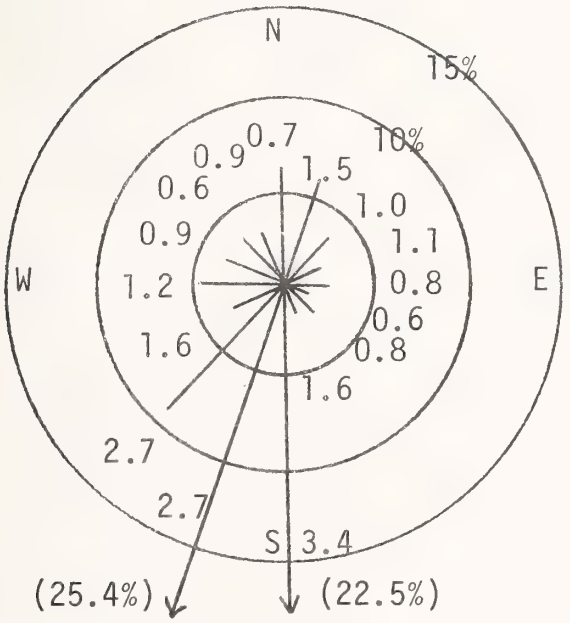
May 1979
Calm 2.6%
(Total Hours 573)



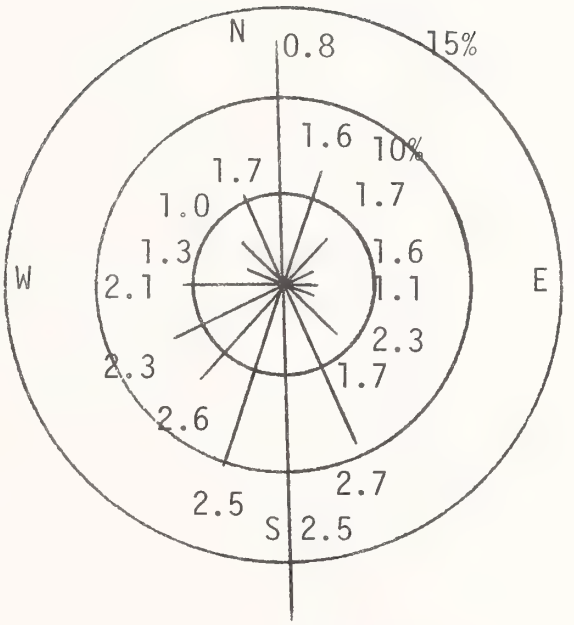
Monthly Wind Roses
Big Sky Stables
Polson, Montana





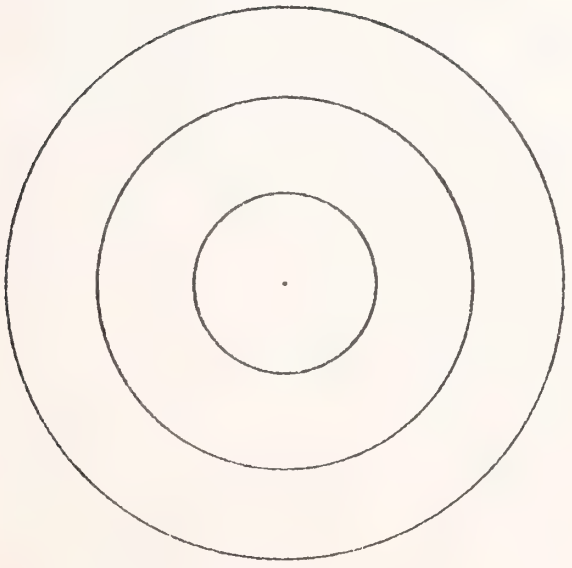


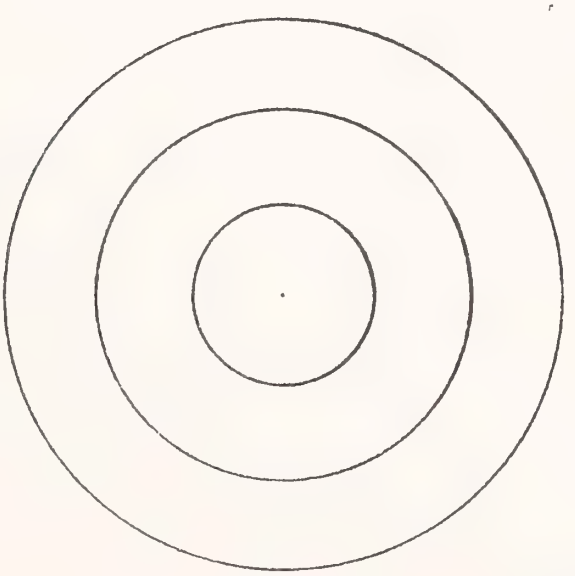
Winter 1978-79
Calm 2.3%
(Total Hours 1367)

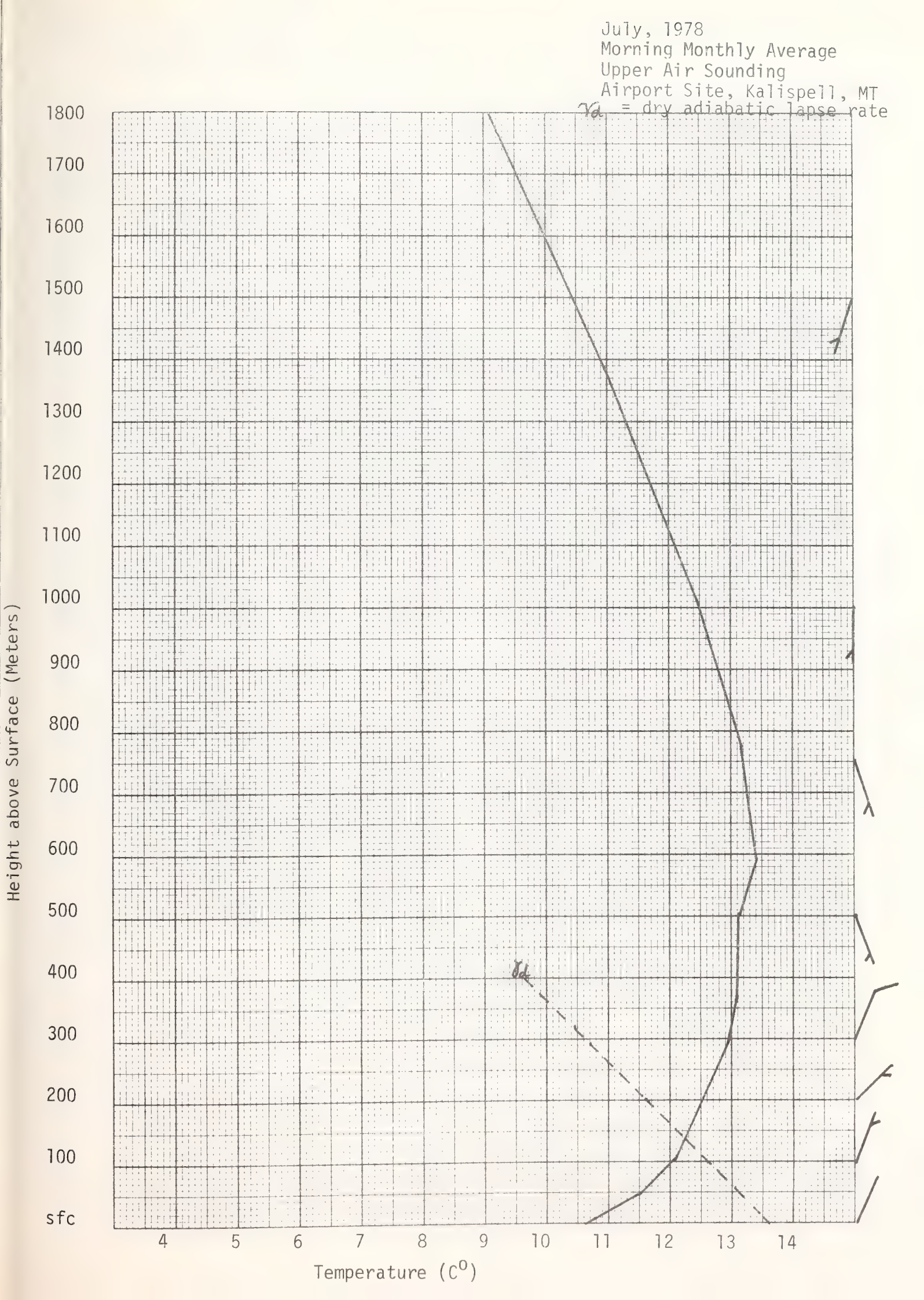


Spring 1979
Calm 4.4%
(Total Hours 995)

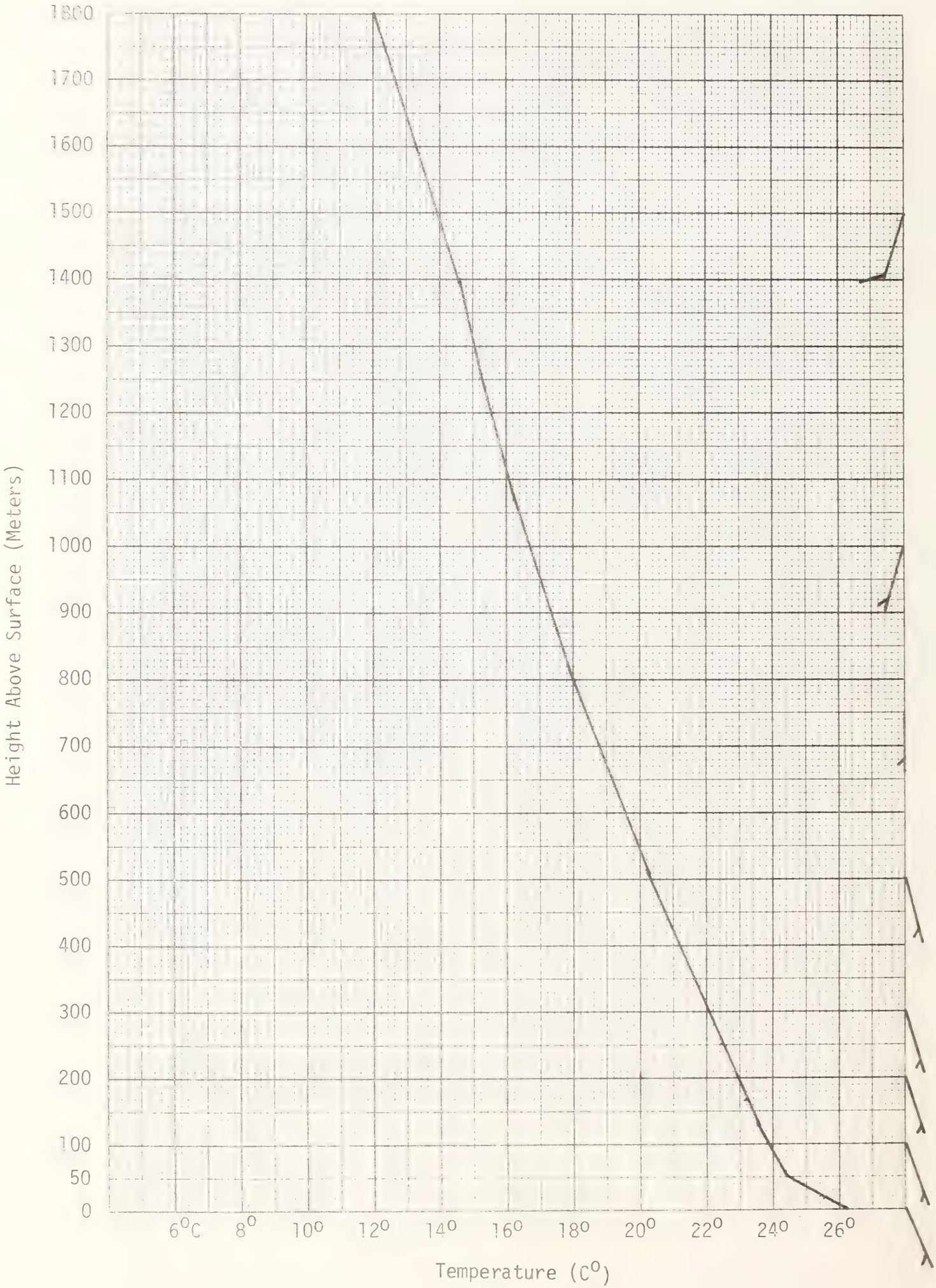
Seasonal Wind Roses
Big Sky Stables
Polson, Montana





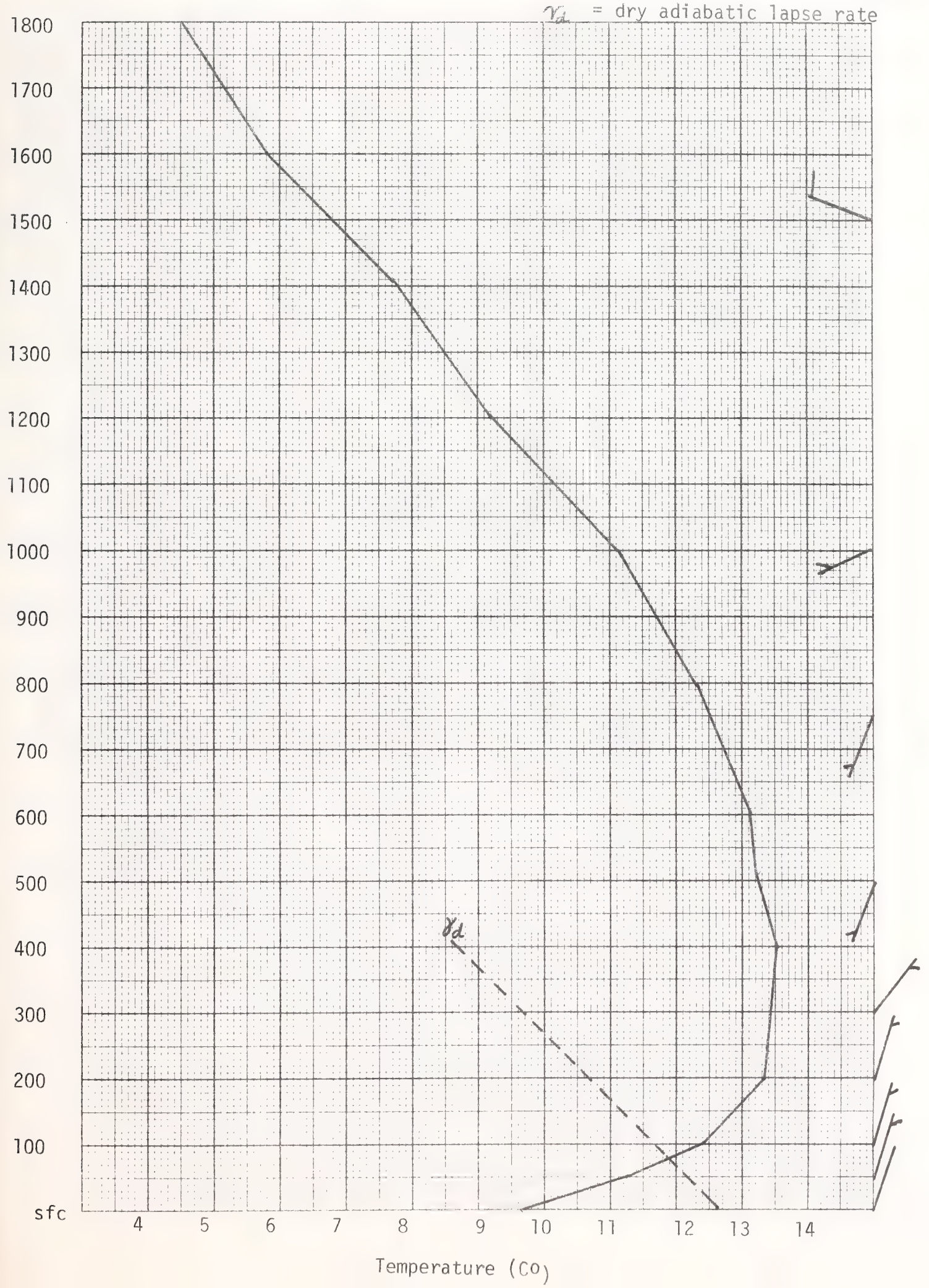

July, 1978
Morning Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
sfc
Height above Surface (Meters)
4
5
6
7
8
9
10
11
12
13
14
Temperature (C°)

July 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT

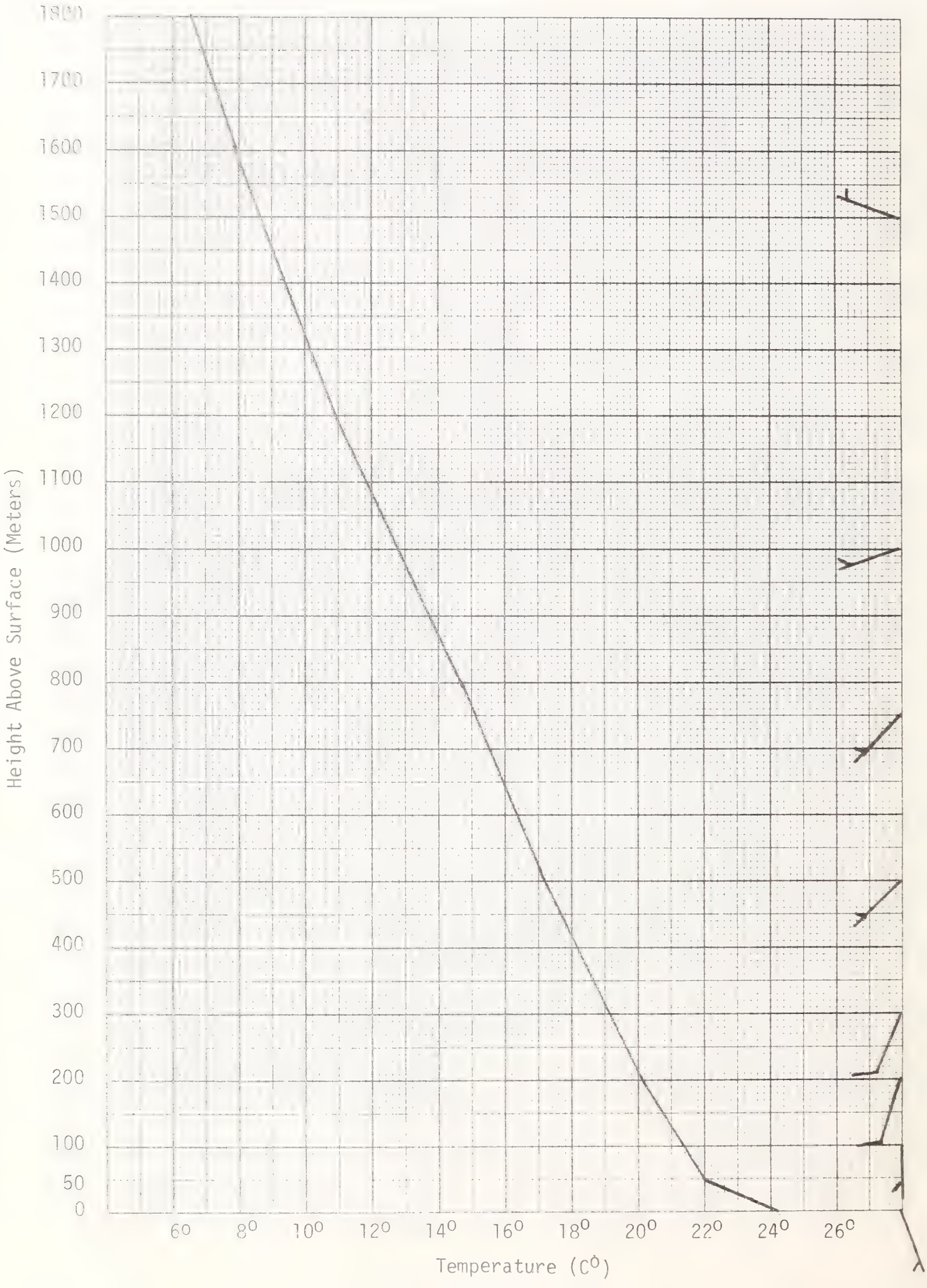


PRINTED IN U.S.A. ON CLEARPRINT TECHNICAL PAPER NO. 1015
20 DIVISIONS PER INCH BOTH WAYS 120 BY 180 DIVISIONS
NO. 10 X 10 TO THE INCH
KEUFFEL & ESSER CO.

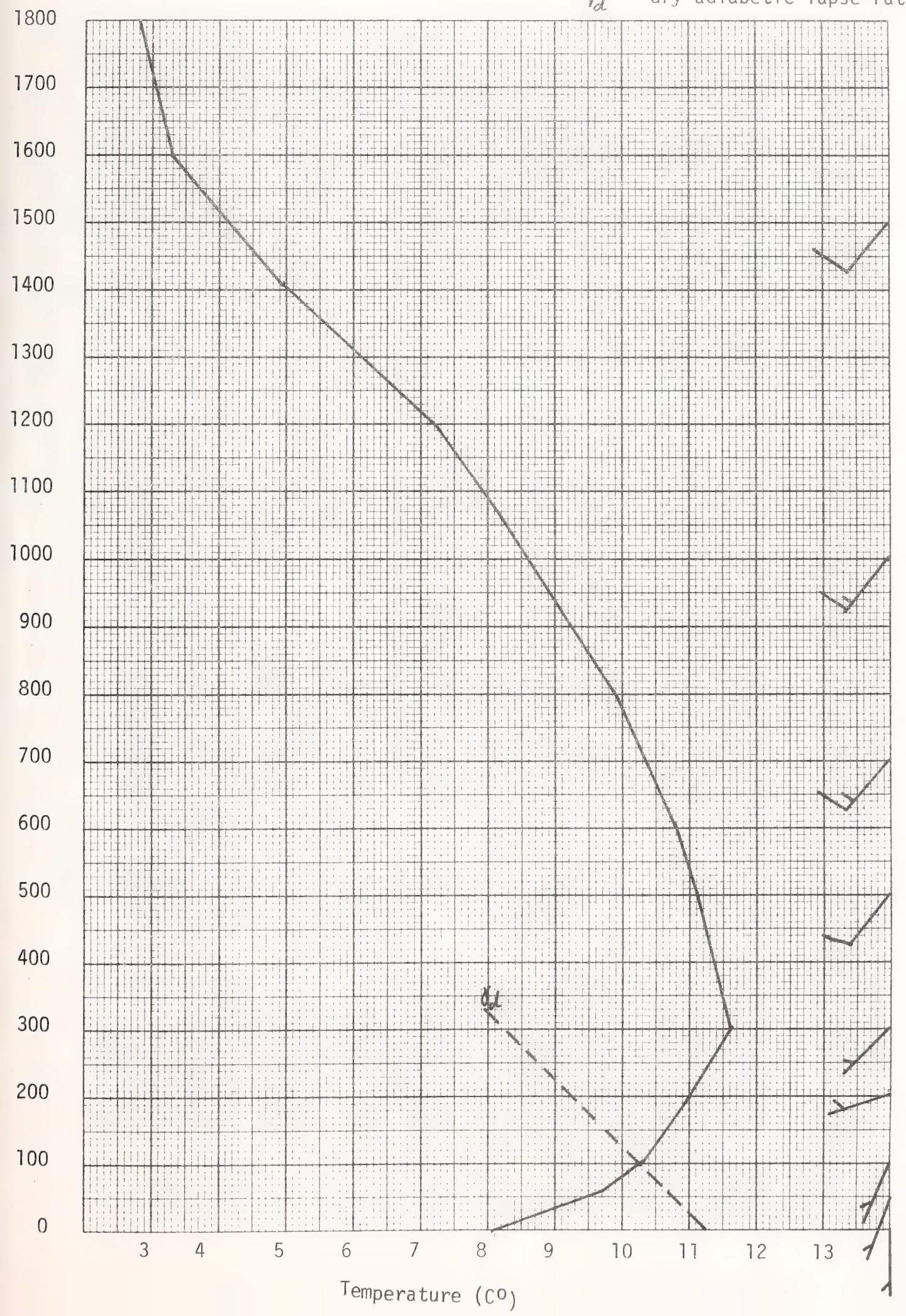
August 1978
Monthly Morning Average
Upper Air Sounding
Airport Site, Kalispell, Montana
γ_d = dry adiabatic lapse rate



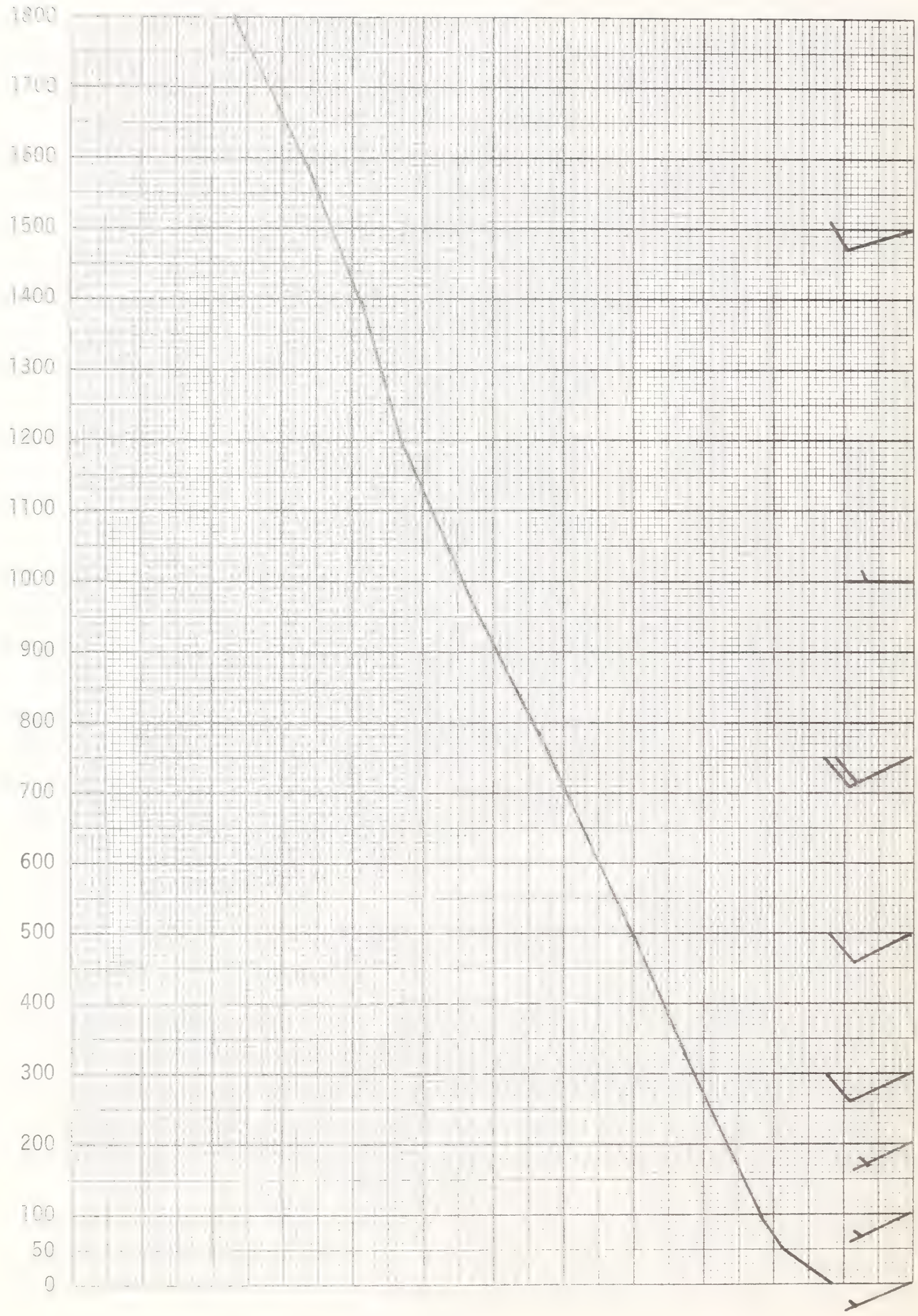
August 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT



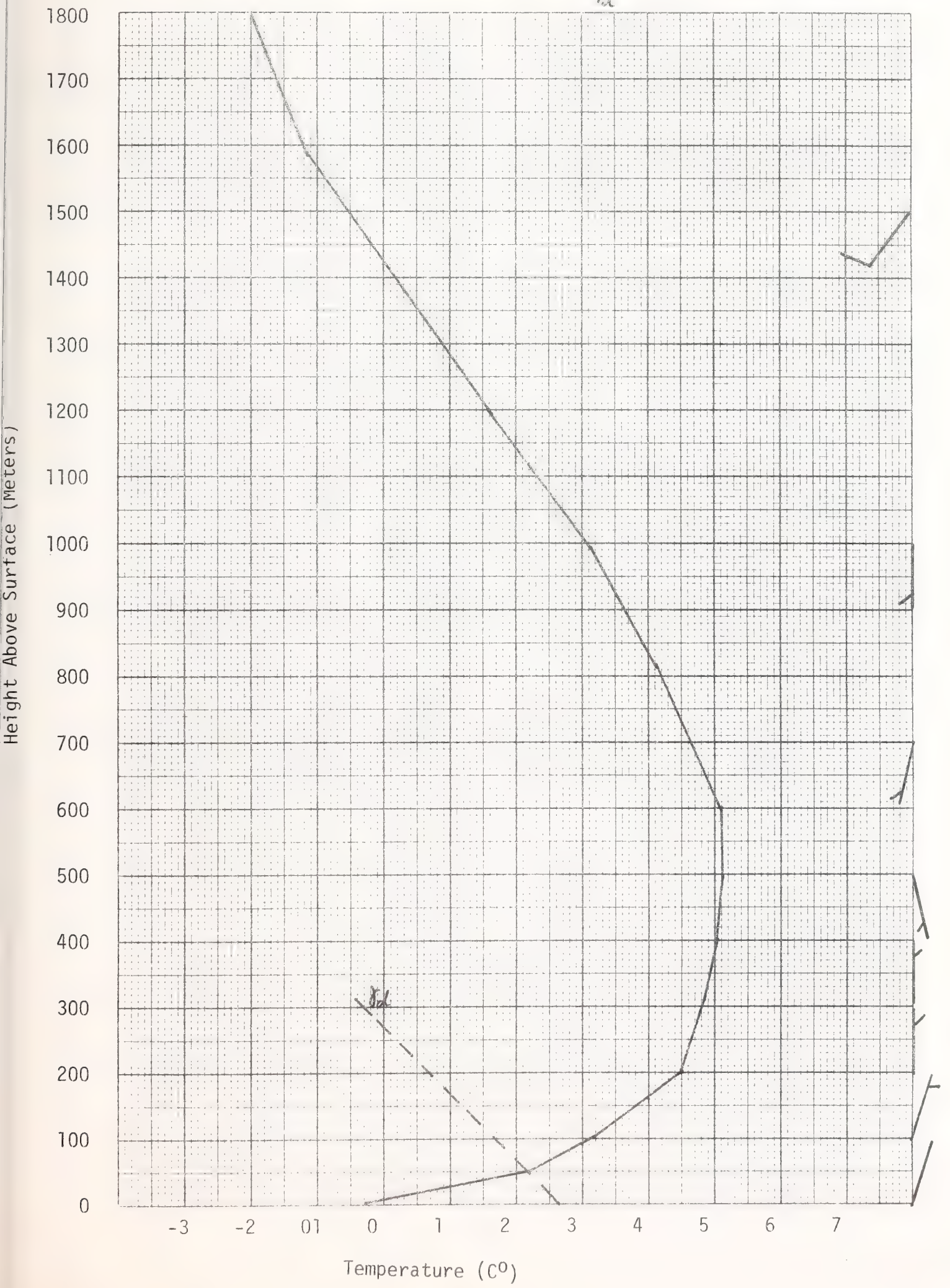
September, 1978
Monthly Morning Average
Upper Air Sounding
Airport Site, Kalispell, Montana
γ_d = dry adiabetic lapse rate



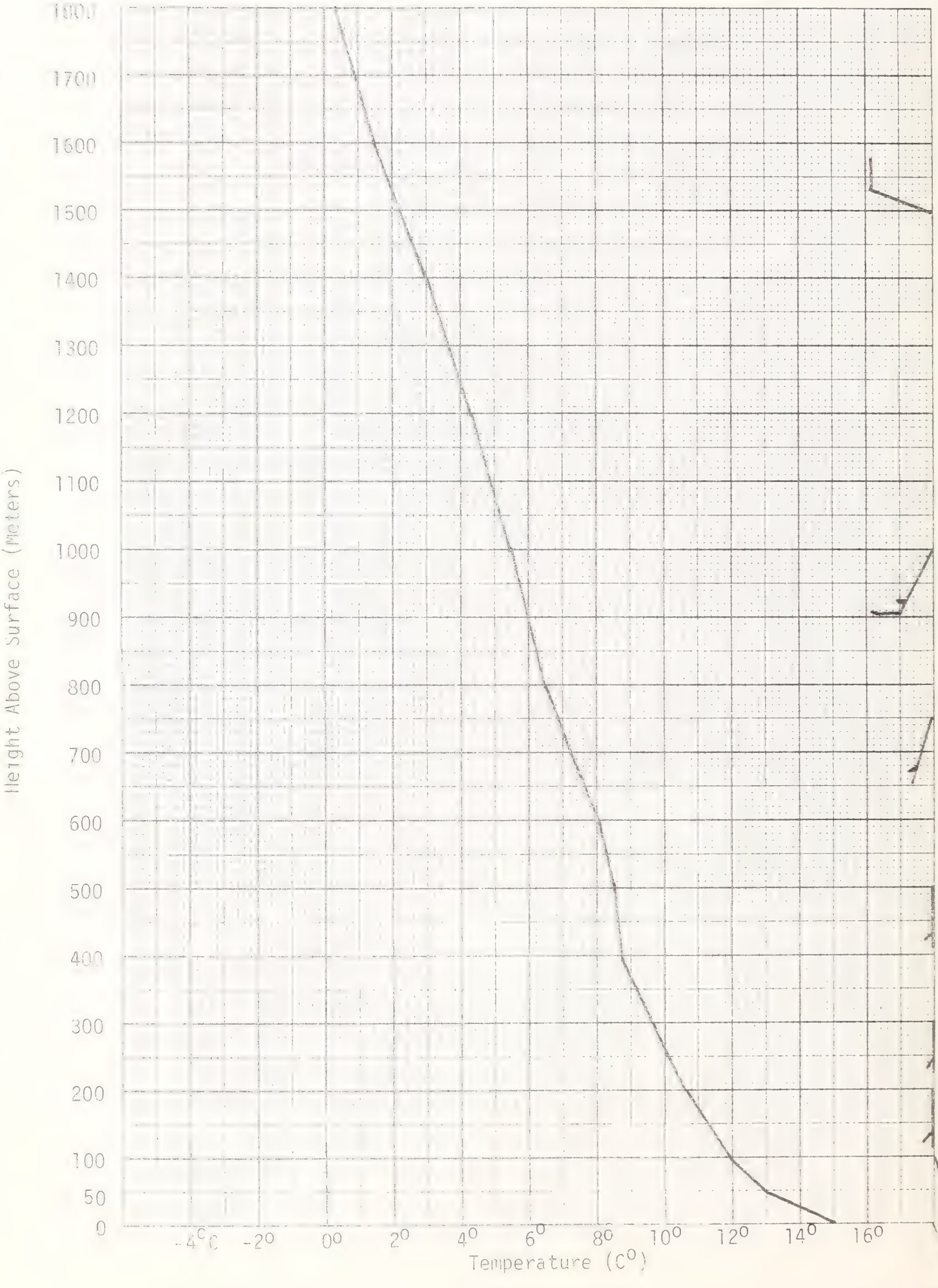
September 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT



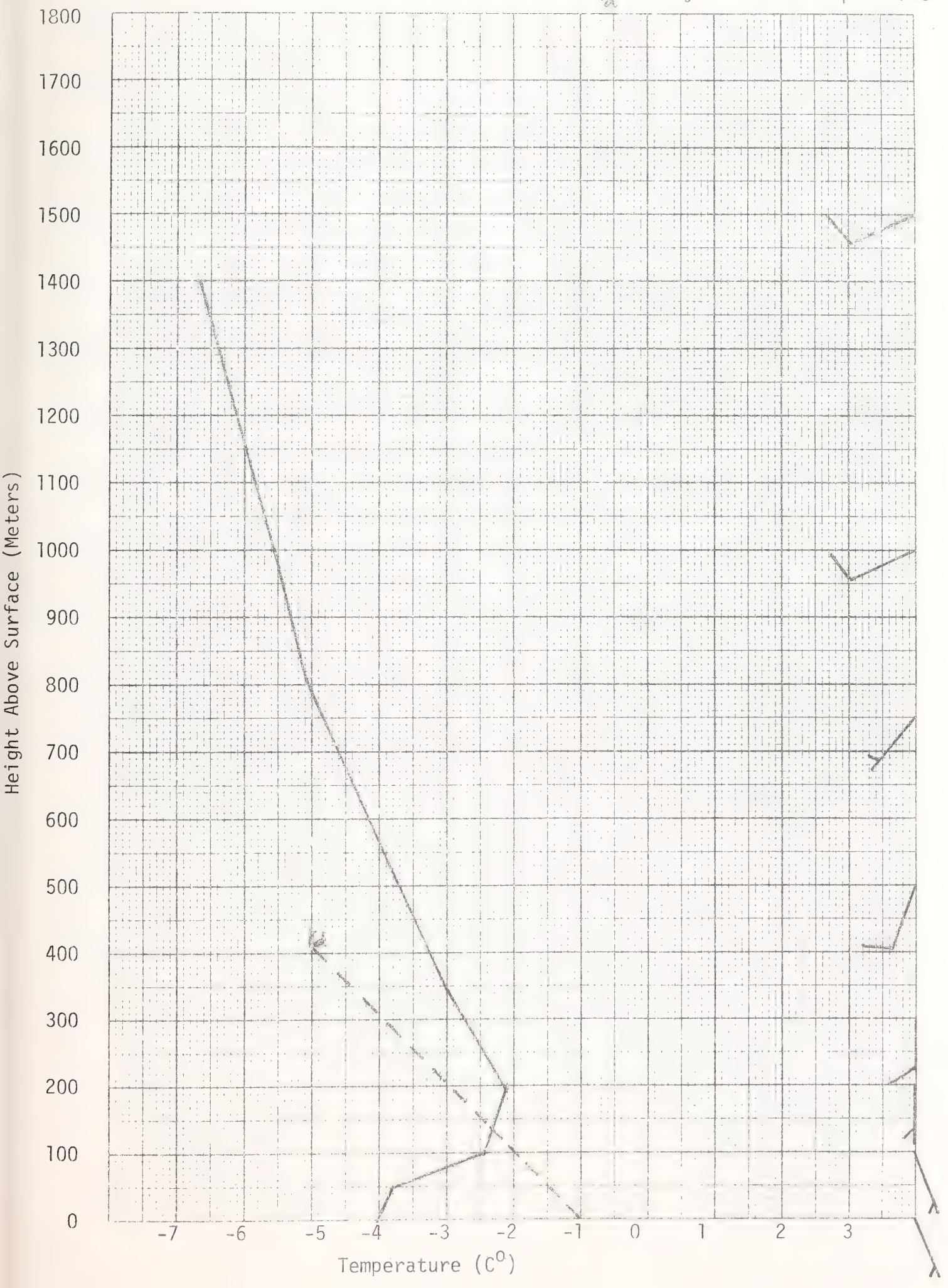
October 1978
Monthly Morning Average
Upper Air Sounding
Airport Site, Kalispell, Montana
γ_d = dry adiabatic lapse rate



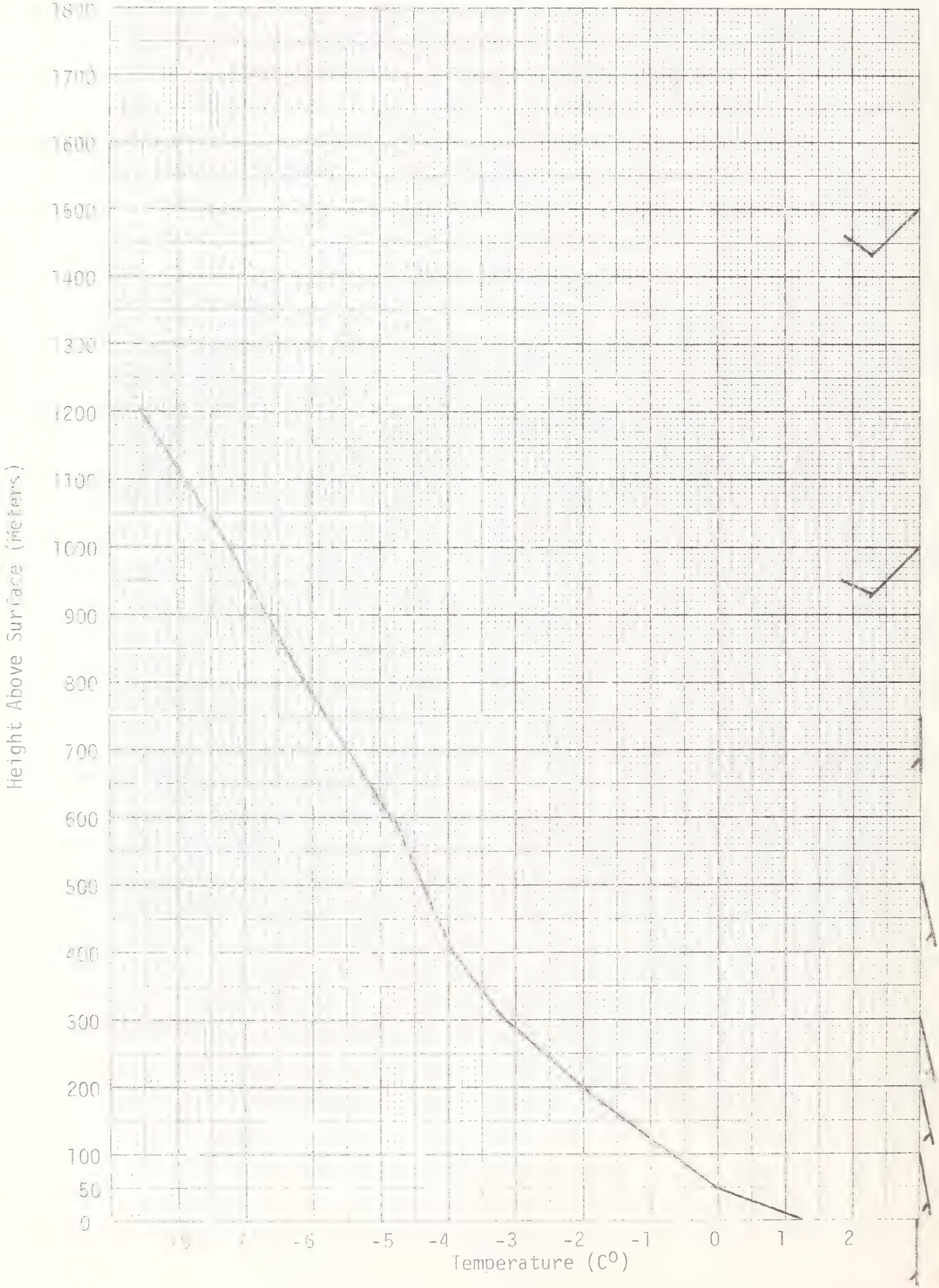
October 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT



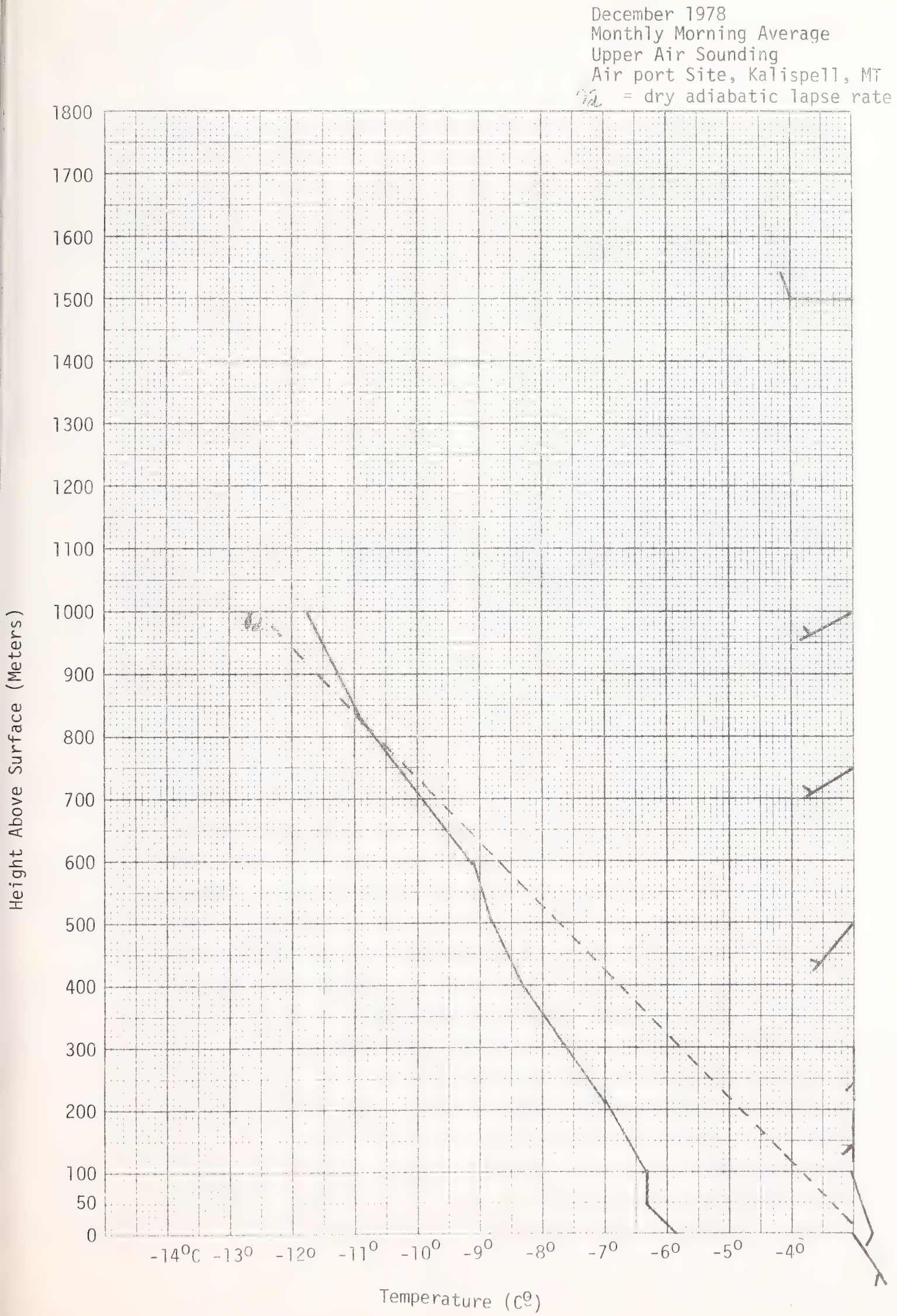
November, 1978
Monthly Morning Average
Upper Air Soundings
Airport Site, Kalispell, Montana
= dry adiabatic lapse rate



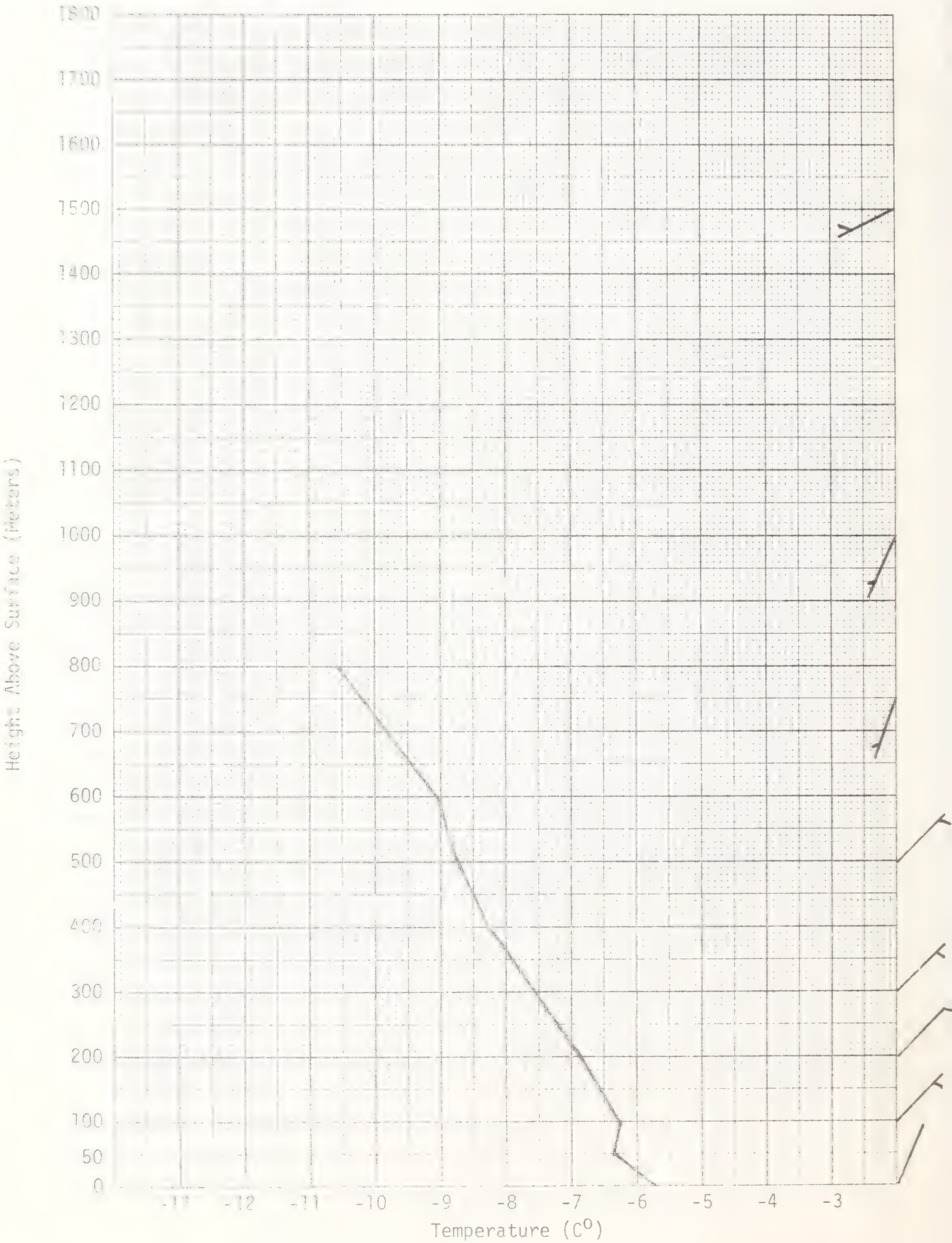
November 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT



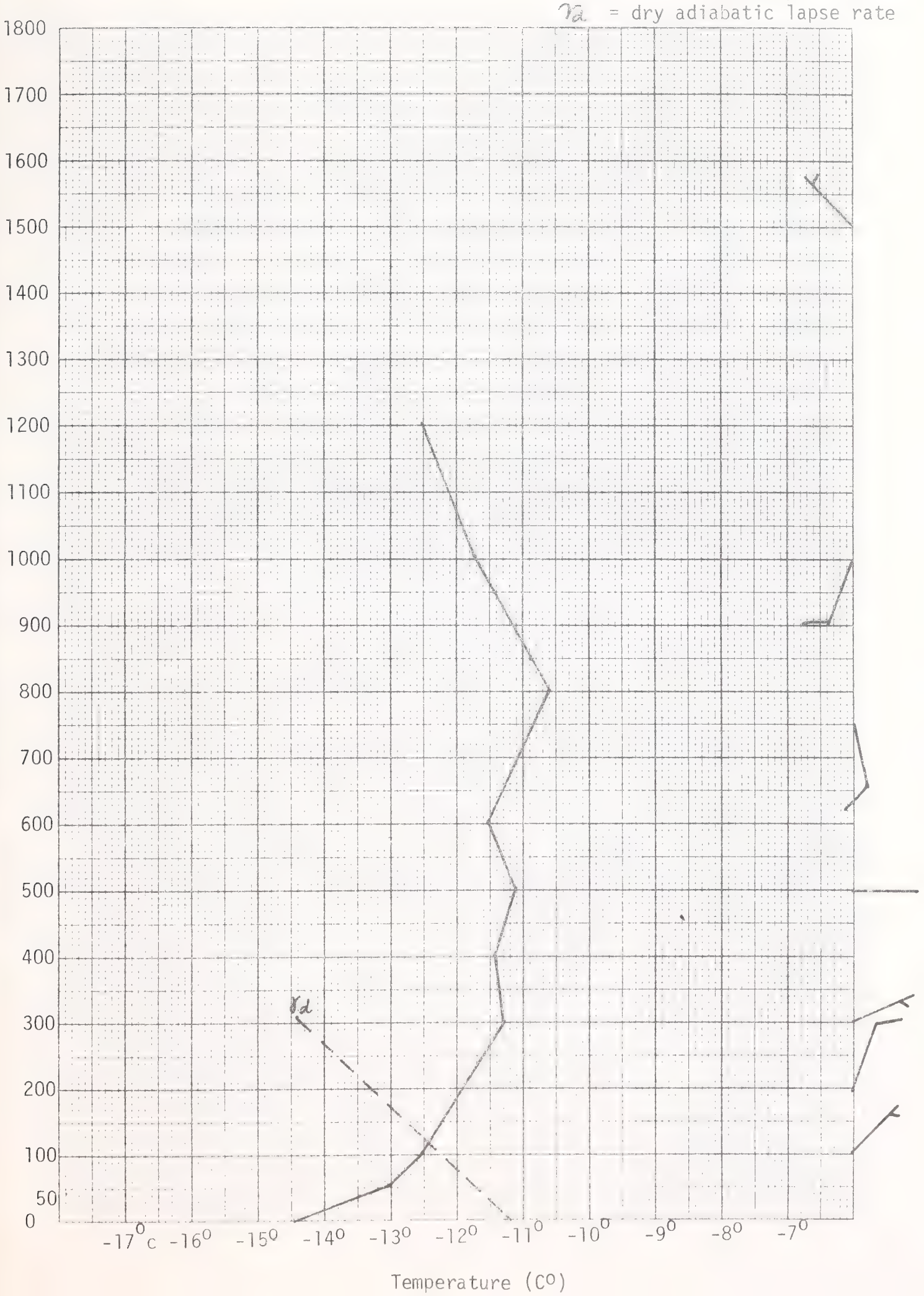
December 1978
Monthly Morning Average
Upper Air Sounding
Air port Site, Kalispell, MT
γ_d = dry adiabatic lapse rate



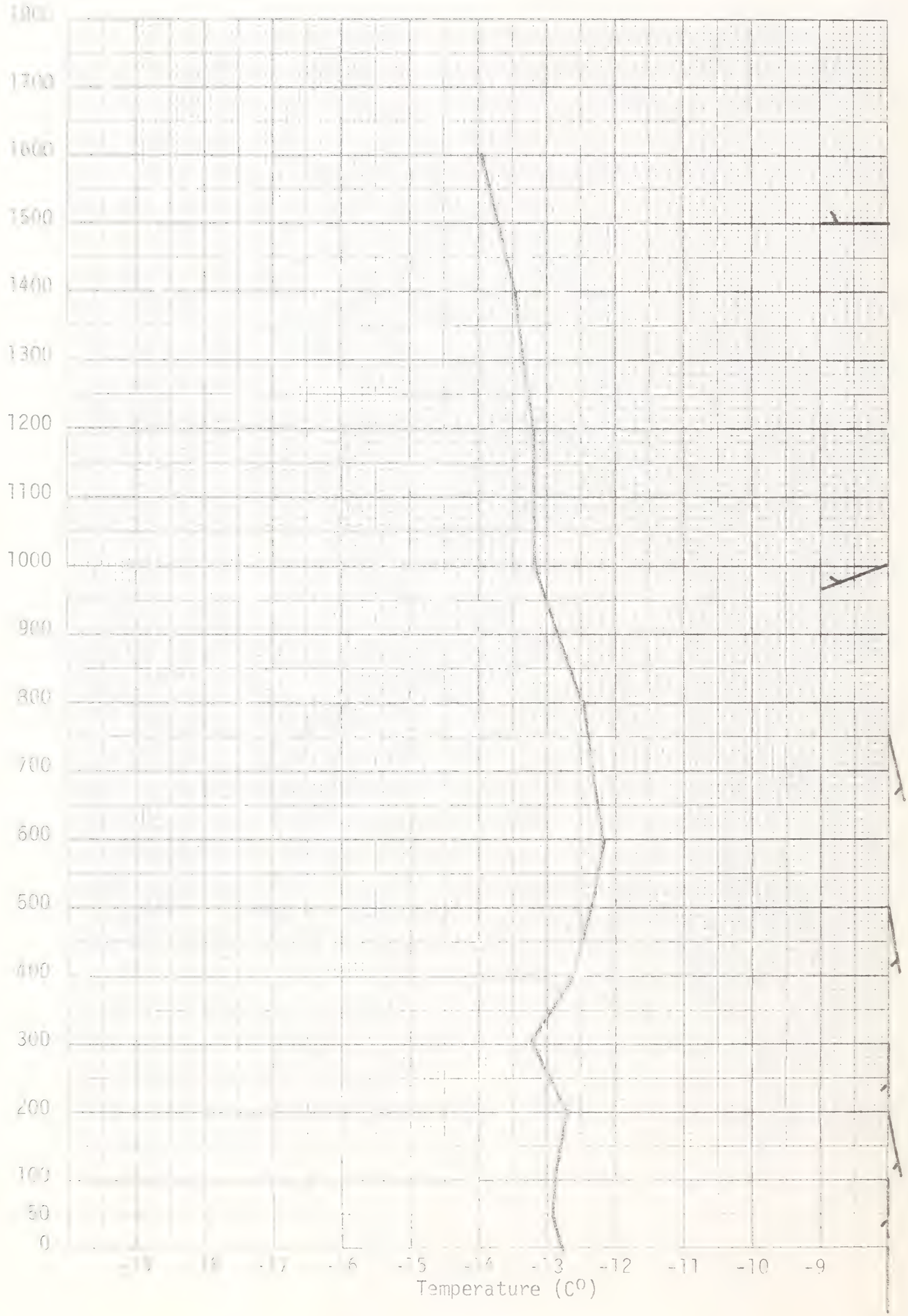
December 1978
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT

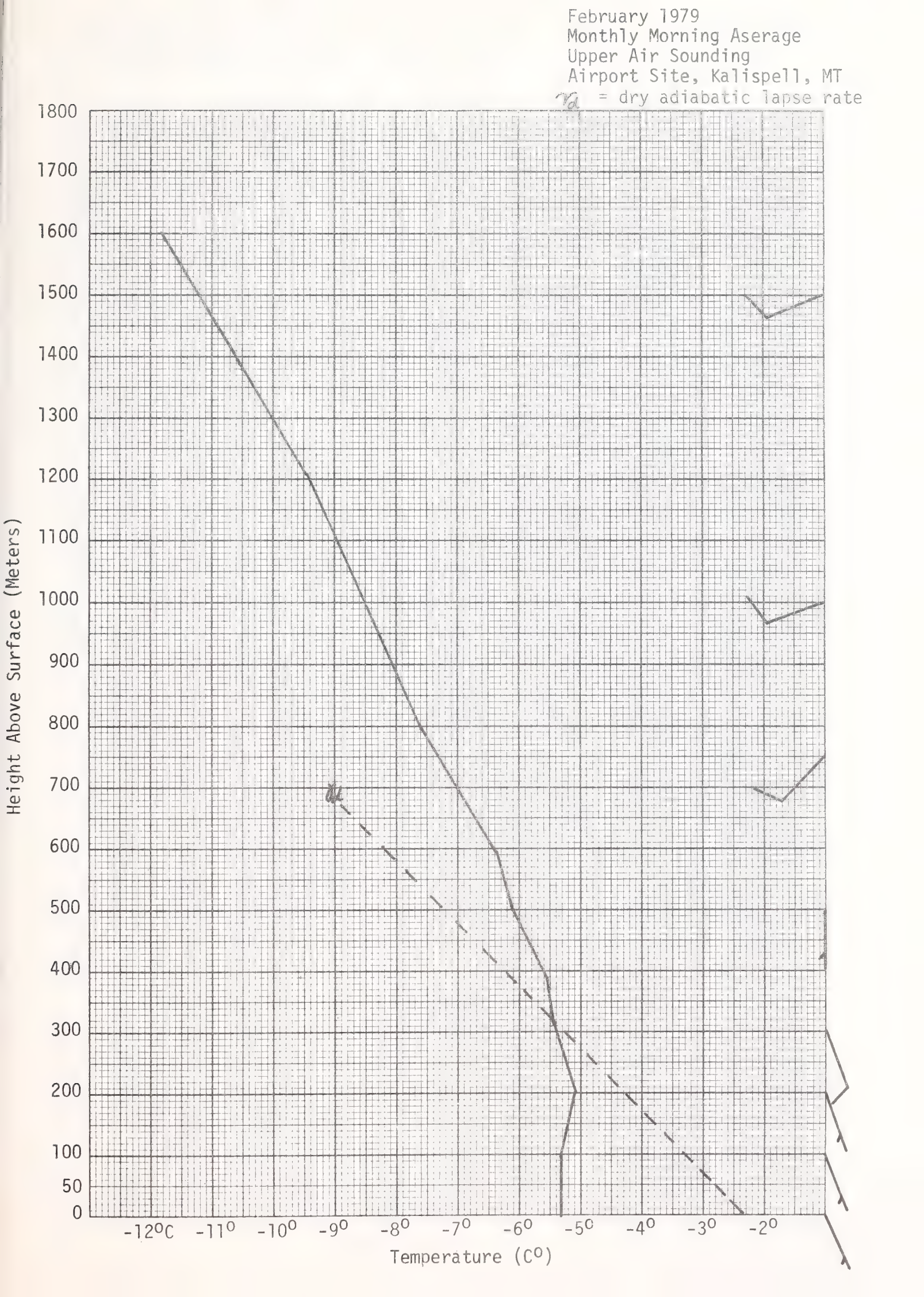


January 1979
Monthly Morning Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate

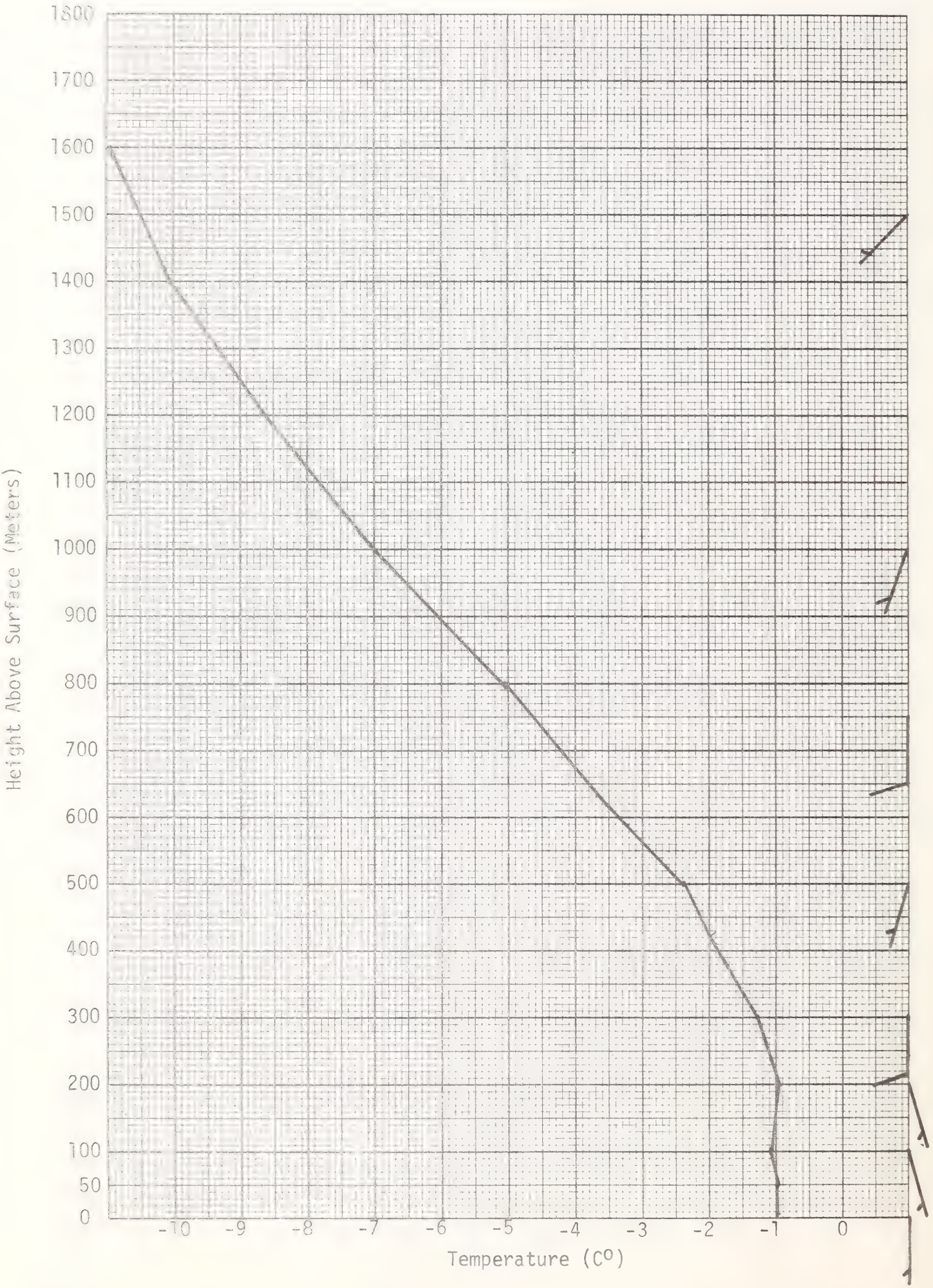


January 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT

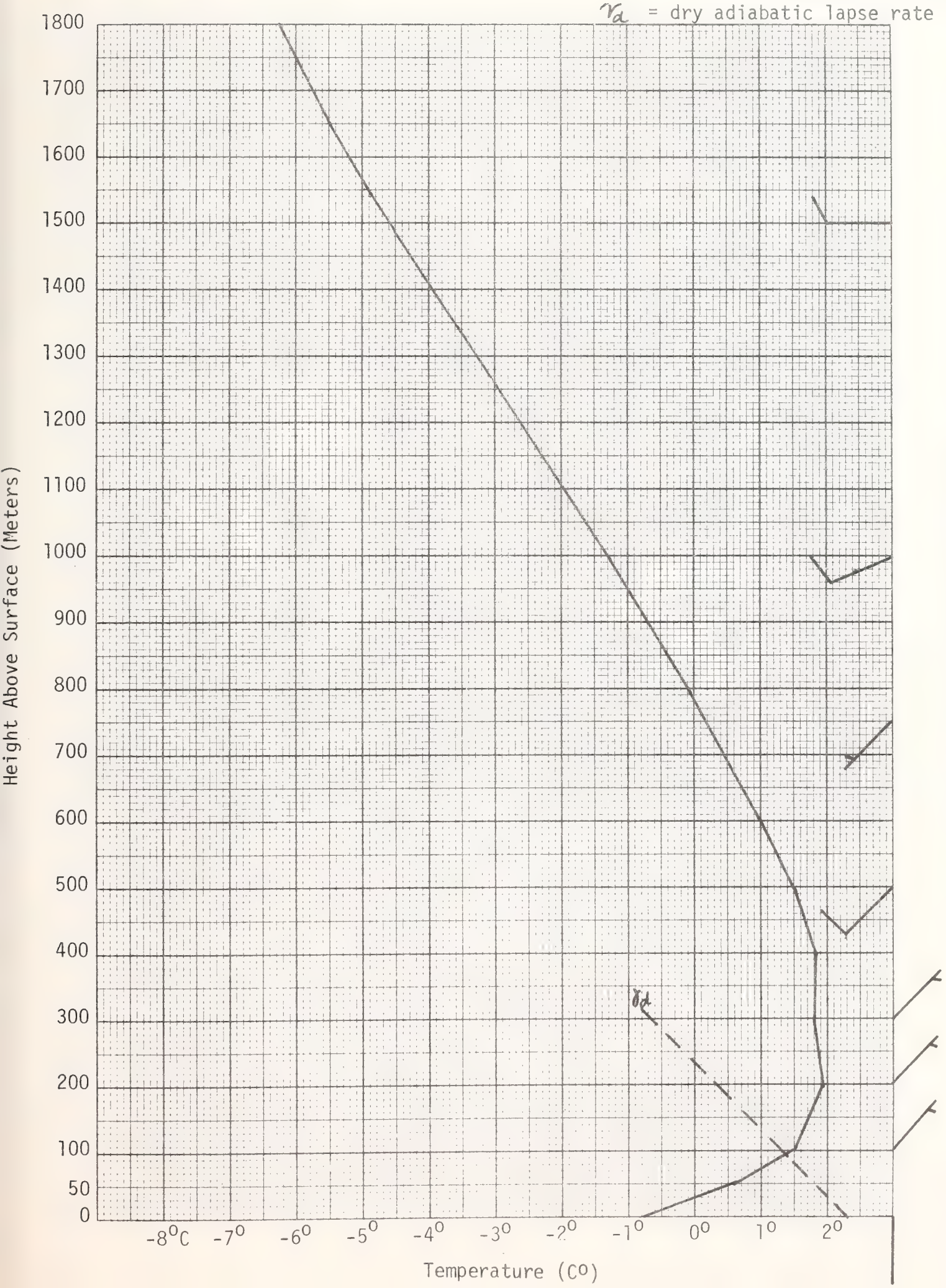



February 1979
Monthly Morning Aserage
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate
Height Above Surface (Meters)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
50
0
-12°C -11° -10° -9° -8° -7° -6° -5° -4° -3° -2°
Temperature (C°)

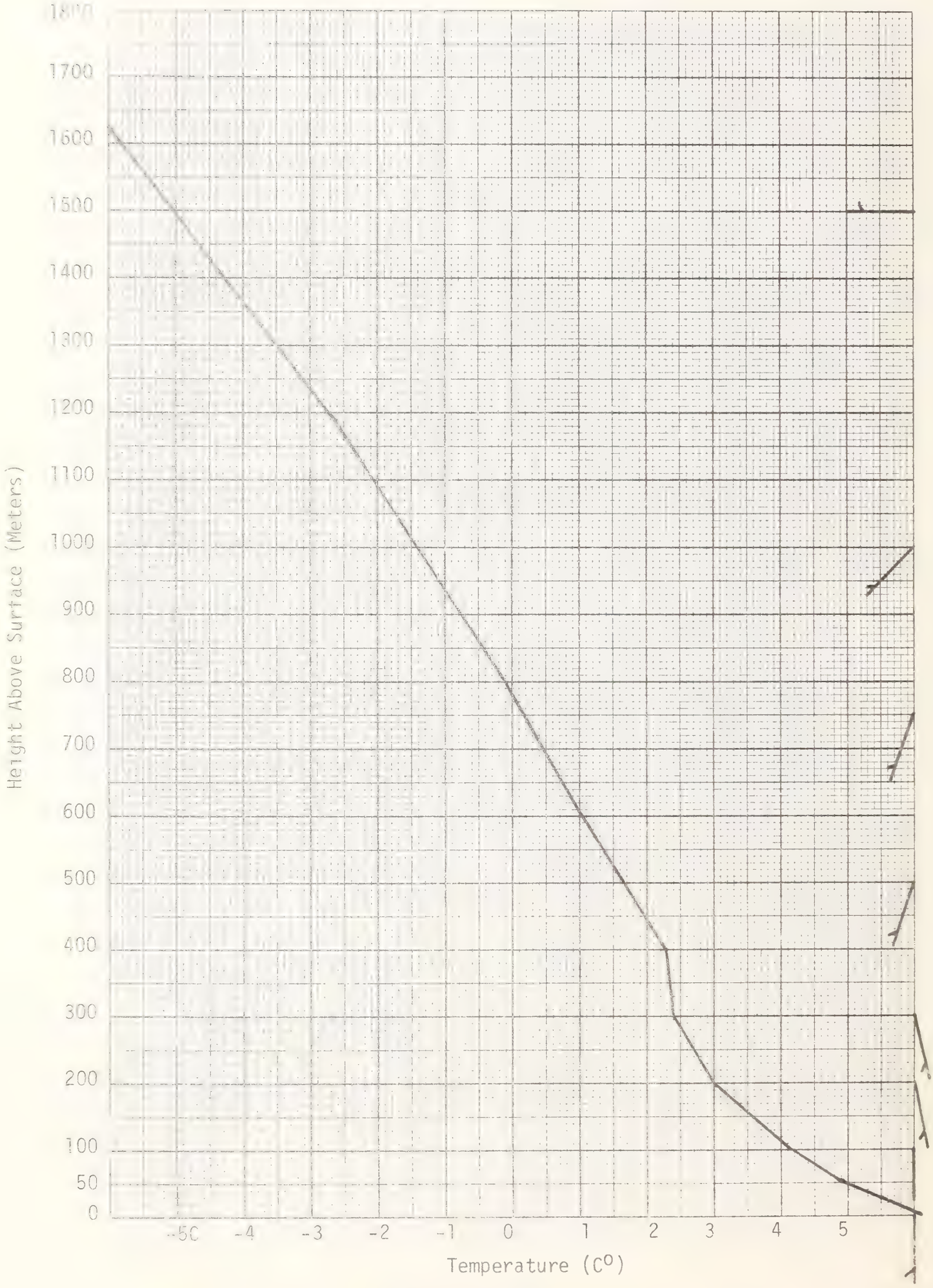
February 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT



March 1979
Monthly Morning Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate

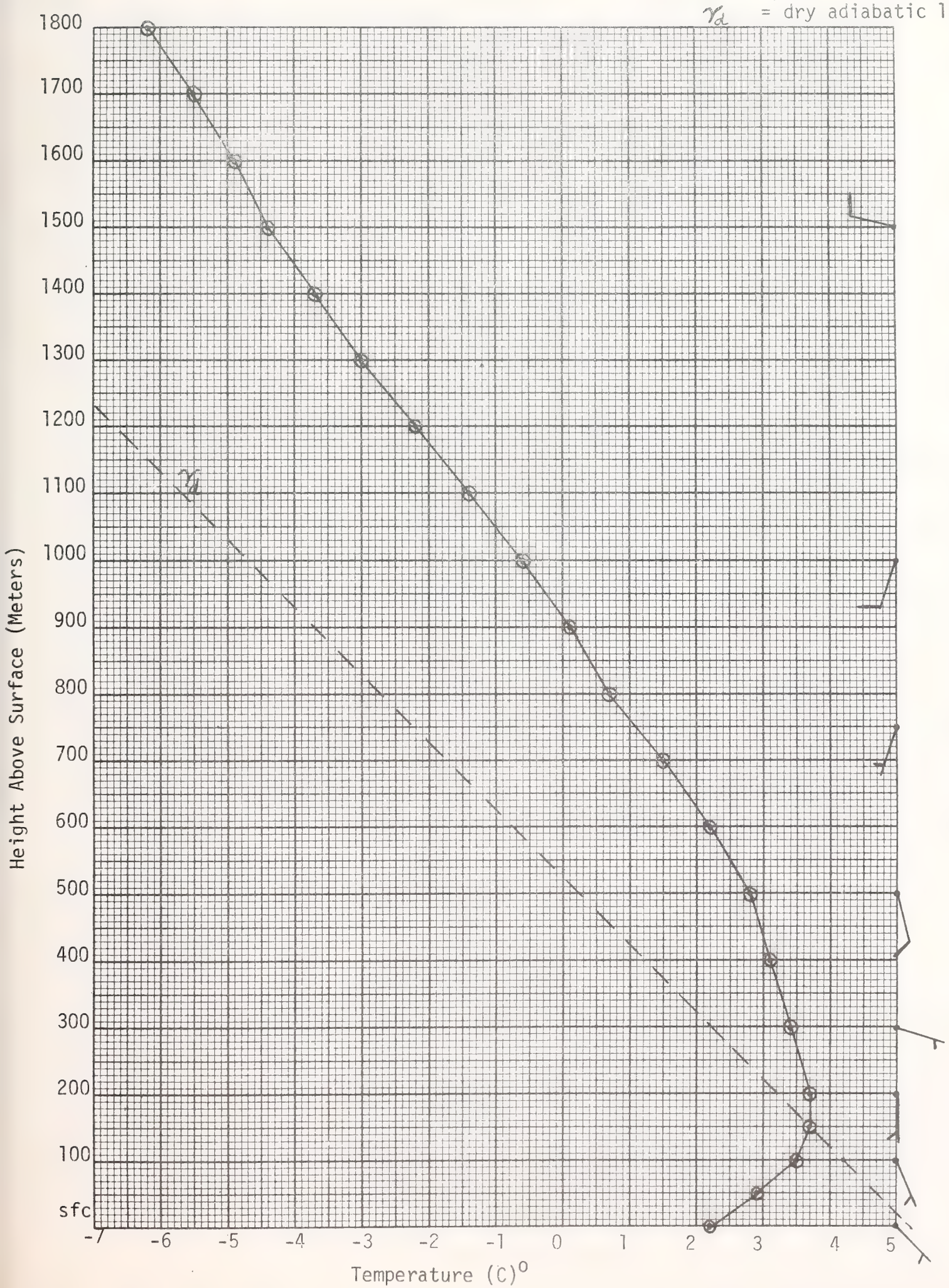


March 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT

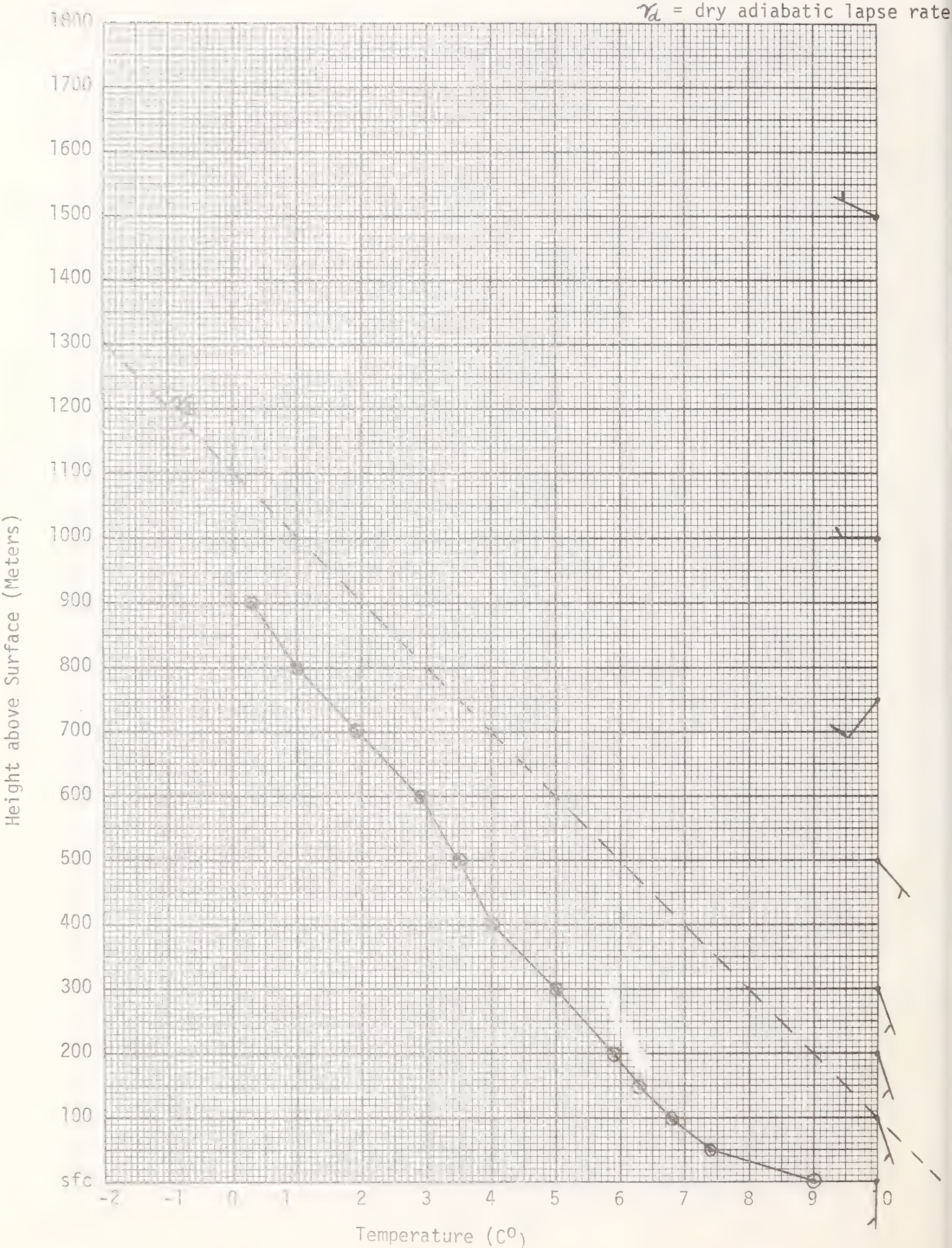


April, 1979
Morning Monthly Average
Upper Air Sounding
Airport Site, Kalispell

γ_d = dry adiabatic lapse rate

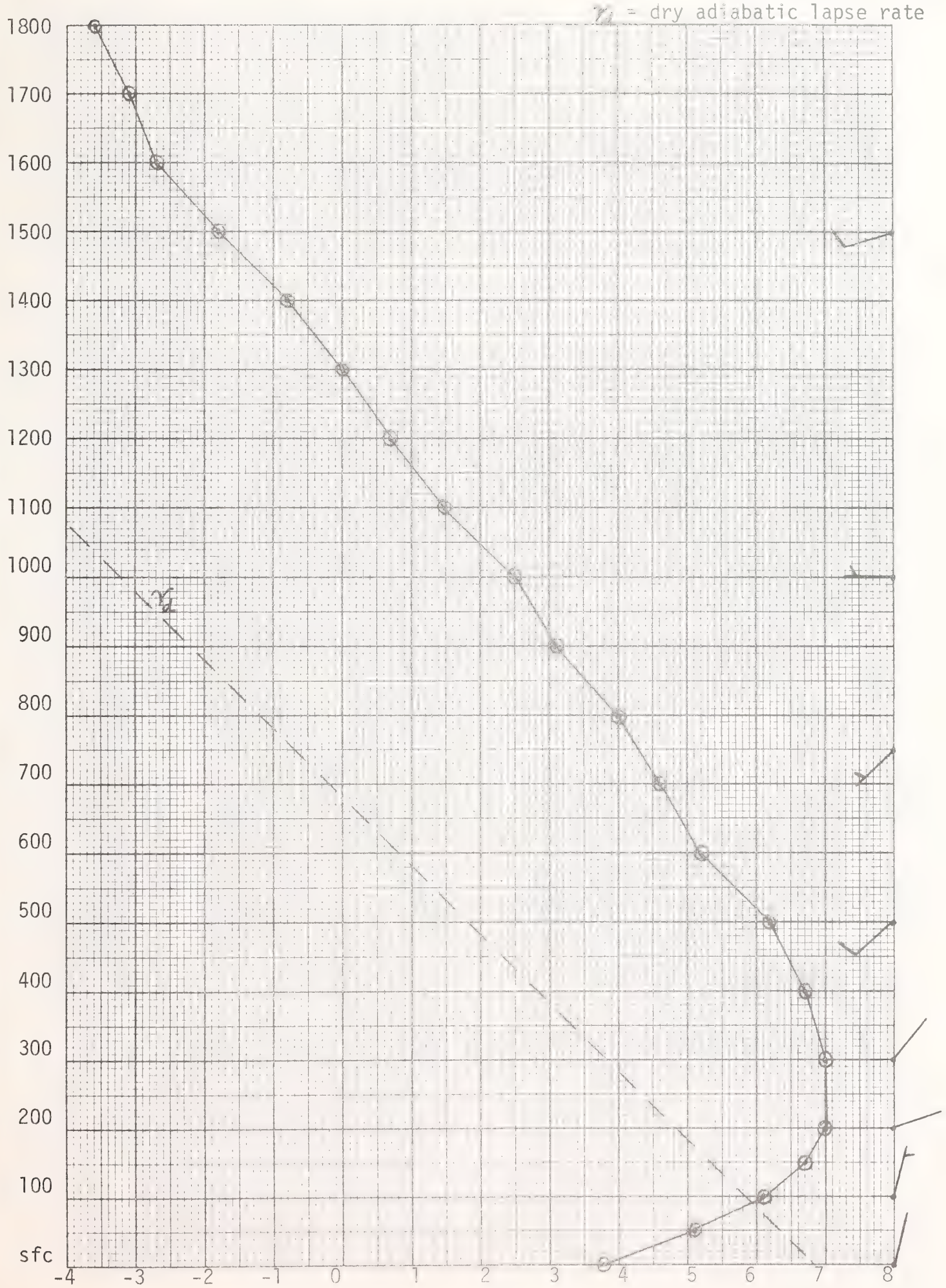


April 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate

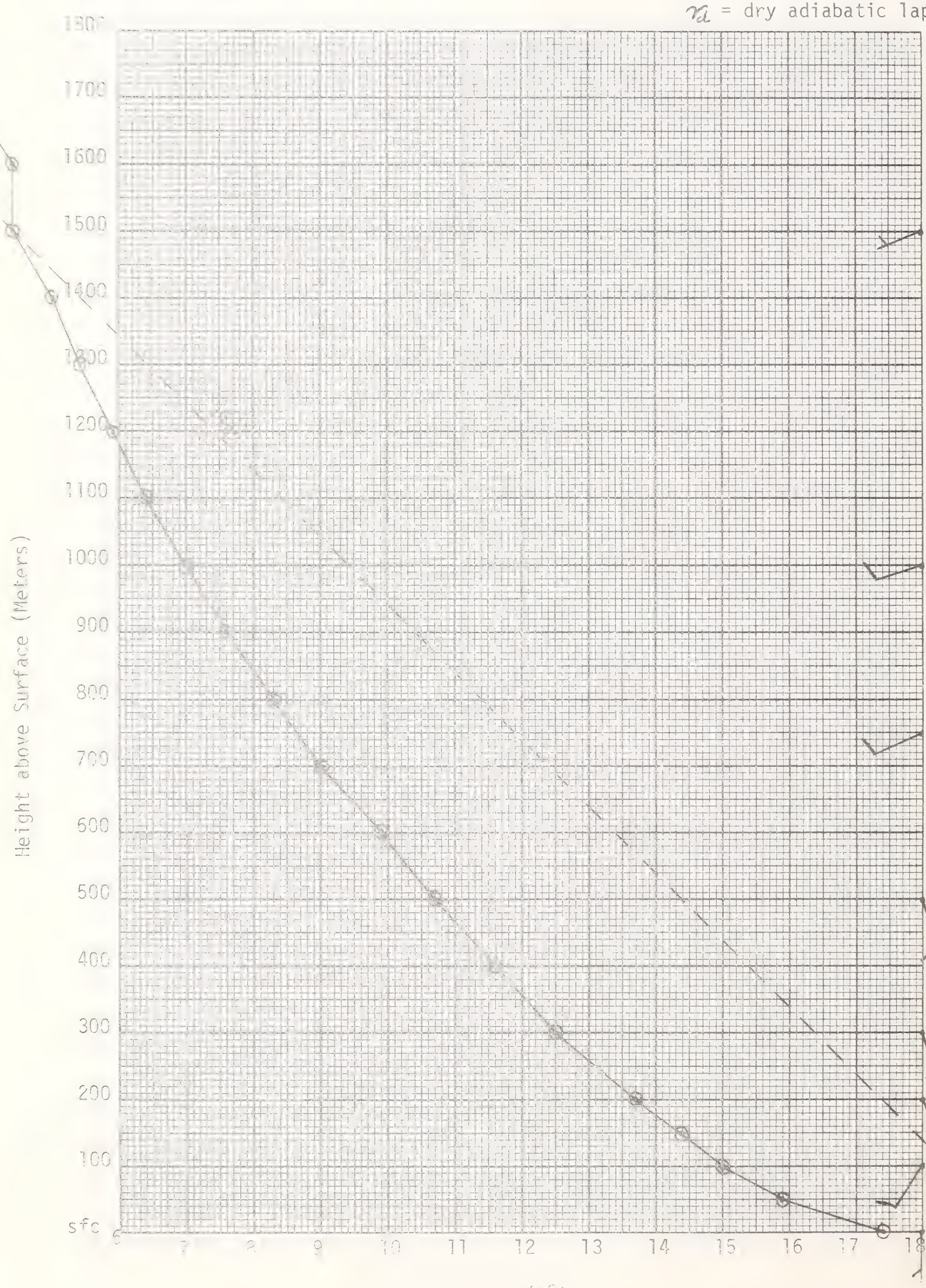


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May 1979
Morning Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate

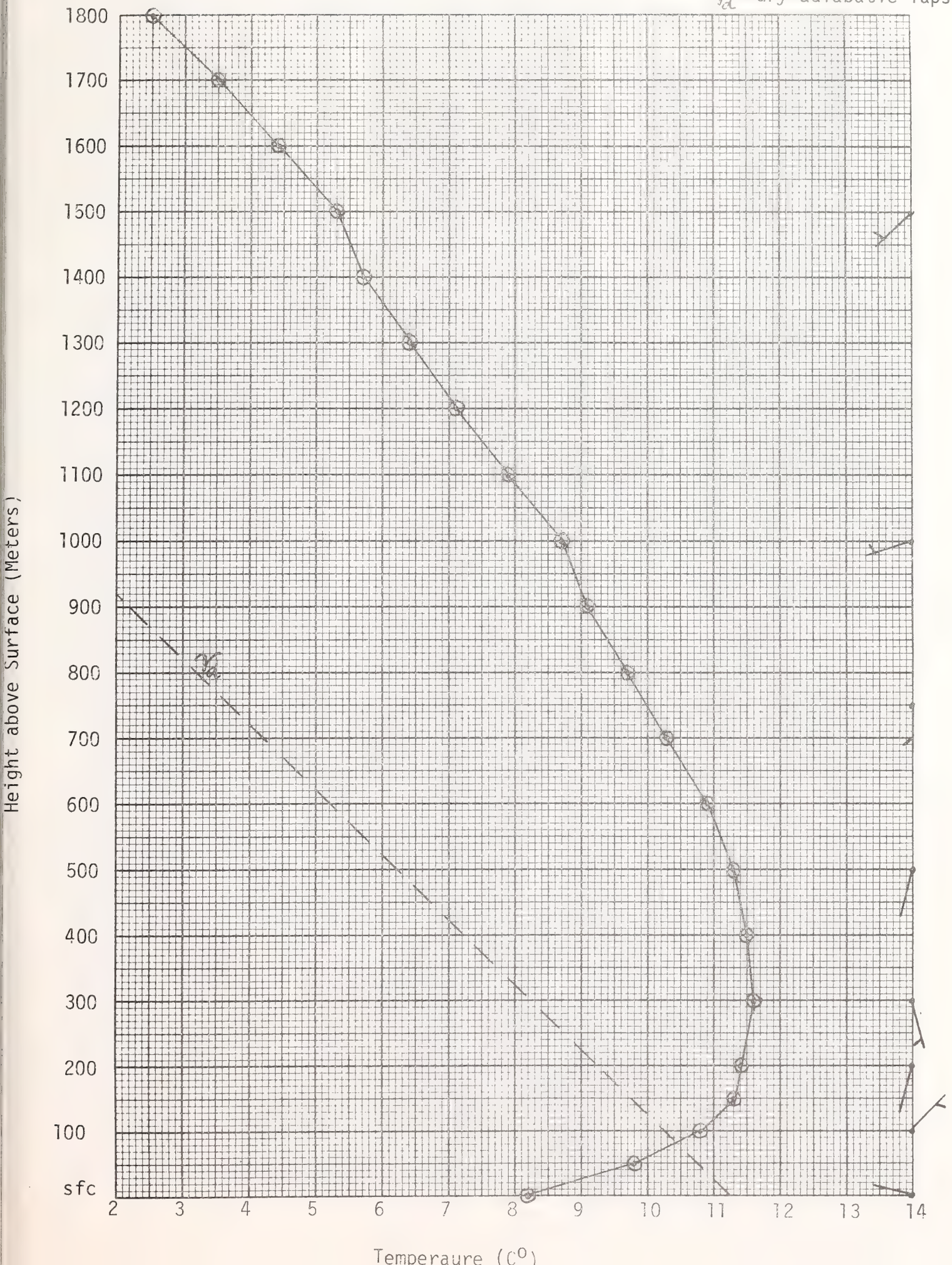


May 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell, MT
γ_d = dry adiabatic lapse rate



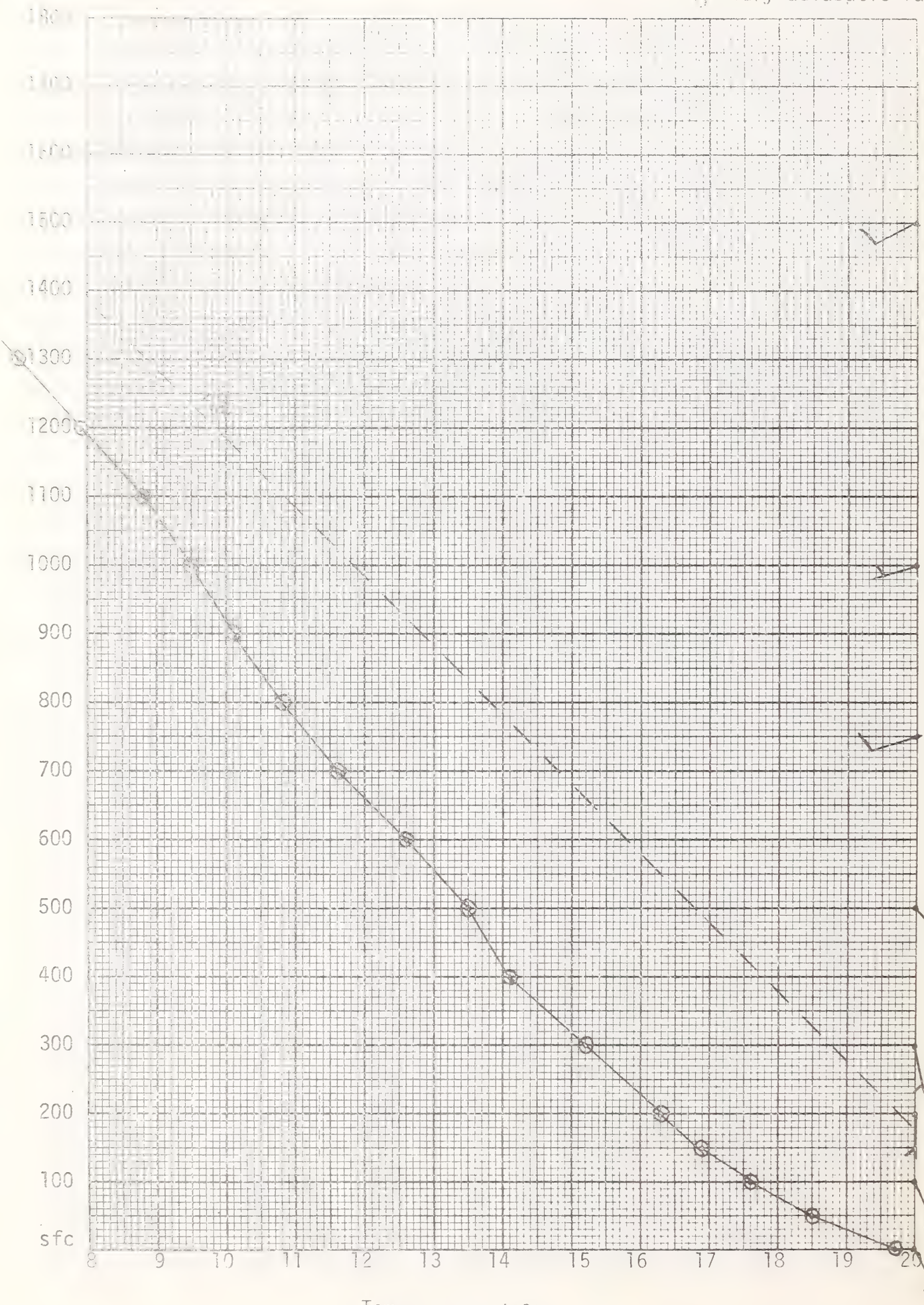
CLEARPRINT PAPER CO. NO. 1210 50 DIVISIONS PER INCH BOTH WAYS, 150 BY 100 DIVISIONS.
PRINTED IN U.S.A. ON CLEARPRINT TECHNICAL PAPER NO. 1215

June 1979
Morning Monthly Average
Upper Air Sounding
Airport Site, Kalispell
γ_d =dry adiabatic lapse rate



June 1979
Afternoon Monthly Average
Upper Air Sounding
Airport Site, Kalispell

=dry adiabatic lapse ra



FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		14.2					1	14.2	4.0
ENE							0	0.0	
E	14.2						1	14.2	.1
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	14.2						1	14.2	2.0
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	14.2						1	14.2	1.0
CALM							3	42.0	
COL. TOTALS	42.6	14.2					7		1.0

SURFACE WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		25.0					1	25.0	3.0
S		25.0	25.0				2	50.0	5.5
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	25.0						1	25.0	1.5
CALM							0	0.0	
COL. TOTALS	25.0	50.0	25.0				4		3.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		14.2					1	14.2	3.9
NNE							0	0.0	
NE	14.2	28.5					3	42.7	3.7
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			14.2				1	14.2	6.0
S		14.2					1	14.2	4.6
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	14.2						1	14.2	2.4
CALM							0	0.0	
COL. TOTALS	28.4	56.9	14.2				7		4.0

100 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	25.0						1	25.0	1.6
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			25.0				1	25.0	8.3
S	25.0	25.0					2	50.0	2.6
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	50.0	25.0	25.0				4		3.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		14.2					1	14.2	5.8
NNE			14.2				1	14.2	6.0
NE	14.2						1	14.2	2.9
ENE	14.2						1	14.2	1.6
E							0	0.0	
ESE							0	0.0	
SE		14.2					1	14.2	5.2
SSE			14.2				1	14.2	6.3
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW			14.2				1	14.2	7.0
CALM							0	0.0	
COL. TOTALS	28.4	28.4	42.6				7		4.9

200 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	25.0						1	25.0	2.4
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		25.0	25.0				2	50.0	6.1
S		25.0					1	25.0	4.0
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0	25.0				4		4.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		14.2	14.2				2	28.4	5.7
NE							0	0.0	
ENE		14.2					1	14.2	3.2
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		14.2					1	14.2	3.7
S							0	0.0	
SSW	14.2		14.2				2	28.4	4.2
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW		14.2					1	14.2	3.8
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	14.2	56.8	28.4				7		4.3

300 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	25.0						1	25.0	1.8
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		50.0	25.0				3	75.0	5.4
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0	25.0				4		4.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		16.6					1	16.6	3.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	16.6	16.6	16.6				3	49.8	3.8
SE							0	0.0	
SSE							0	0.0	
S		16.6					1	16.6	5.9
SSW							0	0.0	
SW		16.6					1	16.6	4.5
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	16.6	66.4	16.6				6		4.3

500 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		50.0					2	50.0	5.4
S	25.0						1	25.0	2.2
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	25.0						1	25.0	1.4
CALM							0	0.0	
COL. TOTALS	50.0	50.0					4		3.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	25.0						1	25.0	2.7
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			25.0				1	25.0	9.4
SSE							0	0.0	
S	25.0						1	25.0	2.5
SSW							0	0.0	
SW							0	0.0	
WSW	25.0						1	25.0	1.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	75.0		25.0				4		4.0

750 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	50.0						1	50.0	2.5
S							0	0.0	
SSW							0	0.0	
SW		50.0					1	50.0	4.4
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	50.0	50.0					2		3.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		25.0					1	25.0	3.8
ENE							0	0.0	
E							0	0.0	
ESE	25.0					25.0	2	50.0	20.0
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW		25.0					1	25.0	3.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0				25.0	4		11.8

1000 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W		100.0					1	100.0	5.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		100.0					1		5.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW	100.0						1	100.0	.8
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	100.0						1		.8

1500 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			100.0				1	100.0	8.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			100.0				1		8.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING JUNE,1978

DIRECTION	******** WIND SPEEDS METERS/SECOND ******** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS							0		

2000 METER LEVEL WINDS AFTERNOON JUNE,1978

DIRECTION	******** WIND SPEEDS METERS/SECOND ******** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			100.0				1	100.0	9.1
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			100.0				1		9.1

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR JUNE 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	0	0
101- 250	0	0
251- 500	0	0
501- 750	0	0
751-1000	0	0
1001-1500	0	0
>1500	0	0
TOTAL	0	0
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	0.0	0.0
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.00	-00.00

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	8.3						1	8.3	1.1
NNE	25.0						3	25.0	1.7
NE	8.3						1	8.3	1.5
ENE	8.3						1	8.3	.8
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	8.3	8.3					2	16.6	2.0
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW	8.3						1	8.3	.5
NW							0	0.0	
NNW	25.0						3	25.0	1.2
CALM							0	0.0	
COL. TOTALS	91.5	8.3					12		1.4

SURFACE WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	10.0						1	10.0	1.3
E							0	0.0	
ESE	10.0						1	10.0	2.6
SE							0	0.0	
SSE			20.0				2	20.0	6.8
S		20.0					2	20.0	3.5
SSW							0	0.0	
SW	20.0						2	20.0	.9
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW		10.0					1	10.0	3.0
NNW	10.0						1	10.0	.5
CALM							0	0.0	
COL. TOTALS	50.0	30.0	20.0				10		3.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	16.6	8.3					3	24.9	2.8
NNE	8.3	8.3	16.6				4	33.2	5.5
NE		8.3					1	8.3	5.6
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.1
SSE		8.3					1	8.3	5.5
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	8.3						1	8.3	.1
WNW							0	0.0	
NW							0	0.0	
NNW		8.3					1	8.3	5.0
CALM							0	0.0	
COL. TOTALS	41.5	41.5	16.6				12		4.0

100 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		10.0					1	10.0	4.3
SSE	20.0	10.0	10.0				4	40.0	3.8
S		10.0					1	10.0	5.4
SSW							0	0.0	
SW	10.0		10.0				2	20.0	5.6
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	10.0						1	10.0	1.5
NNW		10.0					1	10.0	4.4
CALM							0	0.0	
COL. TOTALS	40.0	40.0	20.0				10		4.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	16.6	8.3					3	24.9	2.6
NNE				8.3			1	8.3	10.6
NE	16.6	16.6					4	33.2	3.4
ENE							0	0.0	
E	8.3						1	8.3	1.2
ESE							0	0.0	
SE							0	0.0	
SSE			8.3				1	8.3	7.7
S	8.3						1	8.3	1.2
SSW	8.3						1	8.3	1.7
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	58.1	24.9	8.3	8.3			12		3.6

200 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	10.0						1	10.0	1.1
SE		10.0					1	10.0	4.0
SSE	10.0	10.0	20.0				4	40.0	5.1
S							0	0.0	
SSW							0	0.0	
SW		10.0		10.0			2	20.0	7.6
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW		10.0					1	10.0	3.3
NNW			10.0				1	10.0	8.4
CALM							0	0.0	
COL. TOTALS	20.0	40.0	30.0	10.0			10		5.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	8.3		8.3				2	16.6	3.8
NNE		16.6		8.3			3	24.9	8.1
NE	8.3						1	8.3	2.5
ENE		8.3					1	8.3	3.1
E							0	0.0	
ESE	8.3						1	8.3	1.1
SE							0	0.0	
SSE			8.3				1	8.3	7.6
S		16.6					2	16.6	5.4
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	8.3						1	8.3	1.5
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	41.5	16.6	8.3			12		4.8

300 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	10.0						1	10.0	1.9
SSE		20.0	30.0				5	50.0	5.9
S							0	0.0	
SSW							0	0.0	
SW	10.0						1	10.0	2.8
WSW			10.0				1	10.0	6.0
W							0	0.0	
WNW							0	0.0	
NW		10.0		10.0			2	20.0	7.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	30.0	40.0	10.0			10		5.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING JULY,1976

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	8.3						1	8.3	2.9
NNE			8.3				1	8.3	9.5
NE	8.3						1	8.3	1.9
ENE	8.3						1	8.3	.4
E	8.3		8.3				2	16.6	3.8
ESE							0	0.0	
SE		8.3					1	8.3	3.5
SSE		8.3	16.6				3	24.9	6.7
S			8.3				1	8.3	6.8
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	8.3						1	8.3	1.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	16.6	41.5				12		4.5

500 METER LEVEL WINDS AFTERNOON JULY,1976

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	10.0	10.0	20.0	10.0			5	50.0	6.3
S							0	0.0	
SSW	10.0						1	10.0	1.7
SW	10.0		10.0				2	20.0	4.7
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW				10.0			1	10.0	12.7
NNW		10.0					1	10.0	3.9
CALM							0	0.0	
COL. TOTALS	30.0	20.0	30.0	20.0			10		5.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING JULY,1976

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	9.0						1	9.0	2.8
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	9.0						1	9.0	2.7
SE		9.0	9.0				2	18.0	6.0
SSE	9.0	9.0	18.1				4	36.1	5.2
S	18.1						2	18.1	1.7
SSW			9.0				1	9.0	6.1
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.1	18.0	36.1				11		4.3

750 METER LEVEL WINDS AFTERNOON JULY,1976

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		10.0					1	10.0	4.0
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		10.0					1	10.0	3.3
S	10.0	10.0	10.0				3	30.0	3.8
SSW		20.0					2	20.0	3.8
SW	10.0						1	10.0	2.3
WSW	20.0						2	20.0	2.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	40.0	50.0	10.0				10		3.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	9.0						1	9.0	2.1
ENE							0	0.0	
E							0	0.0	
ESE		9.0					1	9.0	3.5
SE	9.0		9.0				2	18.0	4.9
SSE			18.1				2	18.1	6.7
S		18.1					2	18.1	4.7
SSW		9.0		9.0			2	18.0	6.9
SW							0	0.0	
WSW	9.0						1	9.0	1.2
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	36.1	27.1	9.0			11		4.8

1000 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	10.0						1	10.0	1.6
NE	10.0						1	10.0	1.6
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	10.0		10.0				2	20.0	4.9
SSW	10.0	10.0					2	20.0	3.1
SW		10.0					1	10.0	3.3
WSW	10.0	10.0	10.0				3	30.0	4.9
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	50.0	30.0	20.0				10		3.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	12.5						1	12.5	2.1
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E	12.5						1	12.5	1.1
ESE		12.5					1	12.5	5.0
SE							0	0.0	
SSE							0	0.0	
S		25.0					2	25.0	4.4
SSW		12.5	12.5				2	25.0	5.9
SW							0	0.0	
WSW				12.5			1	12.5	11.5
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0	12.5	12.5			8		5.0

1500 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	14.2						1	14.2	.2
NE							0	0.0	
ENE	14.2						1	14.2	1.9
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE				14.2			1	14.2	10.0
S							0	0.0	
SSW							0	0.0	
SW			14.2				1	14.2	7.2
WSW			14.2	14.2			2	28.4	9.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW			14.2				1	14.2	6.6
CALM							0	0.0	
COL. TOTALS	28.4		42.6	28.4			7		6.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		16.6					1	16.6	3.6
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE			16.6				1	16.6	8.0
SE							0	0.0	
SSE							0	0.0	
S	16.6						1	16.6	2.6
SSW							0	0.0	
SW							0	0.0	
WSW	16.6			16.6			2	33.2	8.4
W		16.6					1	16.6	4.3
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	33.2	16.6	16.6			6		5.8

2000 METER LEVEL WINDS AFTERNOON JULY,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		20.0					1	20.0	3.5
SSE		20.0					1	20.0	3.9
S	20.0						1	20.0	1.5
SSW							0	0.0	
SW							0	0.0	
WSW					20.0		1	20.0	16.7
W							0	0.0	
WNW							0	0.0	
NW			20.0				1	20.0	6.7
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	40.0	20.0		20.0		5		6.4

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF JULY 1978 MORNING

THICKNESS (METERS)	********** INVERSION BASE HEIGHT (METERS) ********** SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	8.8		2.9	8.8	8.8	2.9	8.8					41.0
101-250	5.8		2.9	8.8	8.8	2.9	5.8	2.9	2.9			40.8
251-500	8.8	2.9										11.7
501-750												
TOTAL	23.4	2.9	5.8	17.6	17.6	5.8	14.6	2.9	2.9			
NO INVERSION												5.0
									TOTAL NO. OF OCCURENCES			32

INVERSION TYPE											
1	6.2				6.2	3.1	12.5				28.0
2	3.1		6.2	9.3	6.2	3.1	3.1	3.1	3.1		37.2
3	9.3	3.1		9.3	6.2						27.9
4	6.2										6.2
5											

MONTH OF JULY 1978 AFTERNOON

THICKNESS (METERS)	********** INVERSION BASE HEIGHT (METERS) ********** SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100		5.5	5.5	11.1		5.5	11.1		5.5			44.2
101-250					5.5				5.5			11.0
251-500							5.5					5.5
501-750												
TOTAL		5.5	5.5	11.1	5.5	5.5	16.6		11.0			
NO INVERSION												38.0
									TOTAL NO. OF OCCURENCES			11

INVERSION TYPE											
1							9.0		9.0		18.0
2			9.0				18.1				27.1
3		9.0		18.1	9.0	9.0					45.1
4									9.0		9.0
5											

FREQUENCY SUMMARY OF MIXIAG HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF CCCURENCE FOR JULY 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON CCCURENCES
0- 100	4	0
101- 250	3	0
251- 500	3	1
501- 750	1	0
751-1000	0	4
1001-1500	0	2
>1500	1	3
TOTAL	12	10
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.8	4.7
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-01.62	-02.59

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	33.3						4	33.3	.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE		8.3					1	8.3	3.1
SE							0	0.0	
SSE	8.3						1	8.3	2.2
S	8.3						1	8.3	1.3
SSW							0	0.0	
SW	8.3						1	8.3	2.2
WSW	16.6						2	16.6	.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	16.6						2	16.6	.6
CALM							0	0.0	
COL. TOTALS	91.4	8.3					12		1.2

SURFACE WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	15.3						2	15.3	1.3
SE							0	0.0	
SSE	7.6	15.3					3	22.9	3.9
S	15.3						2	15.3	1.7
SSW		15.3					2	15.3	3.8
SW		7.6					1	7.6	3.1
WSW							0	0.0	
W		7.6					1	7.6	4.5
WNW							0	0.0	
NW	7.6						1	7.6	2.2
NNW	7.6						1	7.6	1.0
CALM							0	0.0	
COL. TOTALS	53.4	45.8					13		2.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N			16.6				2	16.6	6.9
NNE	8.3	8.3	8.3				3	24.9	4.7
NE		8.3	8.3				2	16.6	7.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		8.3					1	8.3	5.6
S		8.3					1	8.3	4.0
SSW	8.3						1	8.3	2.3
SW		8.3					1	8.3	4.2
WSW							0	0.0	
W	8.3						1	8.3	2.0
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	24.9	41.5	33.2				12		5.0

100 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	7.6						1	7.6	1.5
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	15.3						2	15.3	1.3
SE							0	0.0	
SSE	7.6	7.6					2	15.2	3.4
S	15.3	7.6					3	22.9	2.6
SSW		7.6	7.6				2	15.2	6.1
SW		7.6					1	7.6	3.9
WSW							0	0.0	
W	7.6		7.6				2	15.2	5.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	53.4	30.4	15.2				13		3.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		16.6					2	16.6	5.4
NNE	8.3		16.6				3	24.9	5.9
NE		8.3					1	8.3	3.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			8.3				1	8.3	8.1
S		8.3					1	8.3	4.2
SSW		8.3					1	8.3	4.8
SW		8.3					1	8.3	3.8
WSW	8.3						1	8.3	2.9
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	8.3						1	8.3	2.3
CALM							0	0.0	
COL. TOTALS	24.9	49.8	24.9				12		4.8

200 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	7.6						1	7.6	1.1
E	7.6						1	7.6	.6
ESE							0	0.0	
SE	7.6						1	7.6	1.6
SSE	15.3						2	15.3	1.7
S		7.6					1	7.6	3.9
SSW		15.3			7.6		3	22.9	7.9
SW			7.6				1	7.6	6.9
WSW							0	0.0	
W		7.6	7.6				2	15.2	6.2
WNW							0	0.0	
NW							0	0.0	
NNW	7.6						1	7.6	1.3
CALM							0	0.0	
COL. TOTALS	45.7	30.5	15.2		7.6		13		4.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	8.3						1	8.3	2.9
NNE			8.3				1	8.3	8.5
NE	8.3	16.6					3	24.9	3.8
ENE	8.3						1	8.3	1.6
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			8.3				1	8.3	9.1
SSW		25.0					3	25.0	3.9
SW		8.3					1	8.3	5.7
WSW	8.3						1	8.3	2.1
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	49.9	16.6				12		4.4

300 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		7.6					1	7.6	5.8
NE							0	0.0	
ENE							0	0.0	
E	7.6						1	7.6	.6
ESE							0	0.0	
SE	7.6						1	7.6	2.2
SSE	7.6						1	7.6	1.8
S	7.6	7.6					2	15.2	2.6
SSW		7.6	7.6	7.6			3	22.8	7.6
SW			7.6				1	7.6	6.9
WSW							0	0.0	
W	7.6	7.6		7.6			3	22.8	7.0
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	38.0	30.4	15.2	15.2			13		5.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	9.0		9.0				2	18.0	4.2
NNE							0	0.0	
NE							0	0.0	
ENE	9.0						1	9.0	2.6
E	9.0						1	9.0	1.3
ESE							0	0.0	
SE							0	0.0	
SSE	9.0						1	9.0	2.5
S				9.0			1	9.0	13.6
SSW	9.0	9.0	9.0				3	27.0	4.1
SW		9.0	9.0				2	18.0	7.0
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.0	18.0	27.0	9.0			11		5.0

500 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	7.6						1	7.6	1.9
SSE							0	0.0	
S		7.6					1	7.6	3.2
SSW	7.6	15.3					3	22.9	3.6
SW		7.6	15.3				3	22.9	6.2
WSW							0	0.0	
W	7.6	7.6		7.6			3	22.8	4.8
WNW	7.6						1	7.6	.9
NW	7.6						1	7.6	1.3
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	38.0	38.1	15.3	7.6			13		3.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	9.0						1	9.0	2.8
ENE							0	0.0	
E	9.0						1	9.0	2.9
ESE							0	0.0	
SE			9.0				1	9.0	7.4
SSE							0	0.0	
S		9.0					1	9.0	4.4
SSW	18.1		9.0				3	27.1	3.1
SW			9.0		9.0		2	18.0	12.9
WSW		9.0					1	9.0	3.1
W							0	0.0	
WNW							0	0.0	
NW	9.0						1	9.0	2.3
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.1	18.0	27.0		9.0		11		5.2

750 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	15.3						2	15.3	1.5
S		7.6					1	7.6	3.1
SSW			7.6				1	7.6	9.2
SW	7.6	7.6	15.3				4	30.5	5.2
WSW	15.3	7.6					3	22.9	2.4
W		7.6		7.6			2	15.2	9.0
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	38.2	30.4	22.9	7.6			13		4.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	10.0						1	10.0	1.2
NE							0	0.0	
ENE							0	0.0	
E					10.0		1	10.0	19.0
ESE		10.0					1	10.0	3.5
SE							0	0.0	
SSE	10.0						1	10.0	1.4
S				10.0			1	10.0	12.4
SSW			10.0				1	10.0	6.1
SW					10.0		1	10.0	16.4
WSW		10.0	10.0				2	20.0	6.3
W	10.0						1	10.0	1.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.0	20.0	20.0	10.0	20.0		10		7.4

1000 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE					9.0		1	9.0	19.2
ENE			9.0				1	9.0	7.3
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW		9.0					1	9.0	5.4
SW	9.0		9.0				2	18.0	5.2
WSW	9.0		9.0				2	18.0	4.3
W	9.0						1	9.0	.8
WNW							0	0.0	
NW	18.1						2	18.1	1.0
NNW	9.0						1	9.0	1.9
CALM							0	0.0	
COL. TOTALS	54.1	9.0	27.0		9.0		11		5.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		12.5					1	12.5	5.8
SSE							0	0.0	
S	12.5						1	12.5	1.5
SSW							0	0.0	
SW						12.5	1	12.5	37.4
WSW							0	0.0	
W	12.5						1	12.5	2.9
WNW			12.5	12.5			2	25.0	8.4
NW	12.5		12.5				2	25.0	5.4
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	37.5	12.5	25.0	12.5		12.5	8		9.4

1500 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	14.2						1	14.2	2.2
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW			14.2				1	14.2	7.7
SW	14.2						1	14.2	1.4
WSW							0	0.0	
W		14.2	14.2	14.2			3	42.6	8.2
WNW							0	0.0	
NW		14.2					1	14.2	4.2
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	28.4	28.4	28.4	14.2			7		5.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		16.6					1	16.6	4.6
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			16.6				1	16.6	8.4
WNW		16.6					1	16.6	4.8
NW		33.3		16.6			3	49.9	7.8
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		66.5	16.6	16.6			6		6.8

2000 METER LEVEL WINDS AFTERNOON AUGUST,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE						20.0	1	20.0	26.0
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	20.0						1	20.0	2.7
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W		20.0					1	20.0	5.0
WNW		20.0					1	20.0	5.9
NW	20.0						1	20.0	1.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	40.0	40.0				20.0	5		8.1

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF AUGUST 1978 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	6.4	6.4	3.2	12.9	16.1	3.2	6.4	3.2	3.2			61.0
101-250	9.6	3.2	3.2	3.2	3.2			3.2				25.6
251-500	9.6											9.6
501-750			3.2									3.2
TOTAL	25.6	9.6	9.6	16.1	19.3	3.2	6.4	6.4	3.2			
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				31

INVERSION TYPE	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
1			3.2	3.2	6.4		3.2	3.2				19.2
2	3.2			9.6		3.2	3.2					19.2
3	12.9*	6.4	6.4	3.2	9.6			3.2				41.7
4	9.6	3.2			3.2				3.2			19.2
5												

MONTH OF AUGUST 1978 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100												
101-250								16.6	8.3			24.9
251-500												
501-750												
TOTAL								16.6	8.3			
NO INVERSION												75.0
								TOTAL NO. OF OCCURENCES				3

INVERSION TYPE	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
1								33.3				33.3
2								33.3	33.3			66.6
3												
4												
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR AUGUST 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	6	0
101- 250	1	0
251- 500	4	0
501- 750	0	2
751-1000	0	0
1001-1500	1	1
>1500	0	8
TOTAL	12	11

AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.8	4.7
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.66	-01.18

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	11.1	11.1					2	22.2	3.0
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	11.1						1	11.1	2.2
S	11.1	11.1					2	22.2	2.7
SSW							0	0.0	
SW	11.1						1	11.1	.4
WSW	11.1						1	11.1	.4
W							0	0.0	
WNW	11.1						1	11.1	.9
NW							0	0.0	
NNW	11.1						1	11.1	.7
CALM							0	0.0	
COL. TOTALS	77.7	22.2					9		1.7

SURFACE WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			12.5				1	12.5	6.7
ENE							0	0.0	
E		12.5					1	12.5	4.5
ESE							0	0.0	
SE							0	0.0	
SSE		12.5					1	12.5	3.1
S		25.0					2	25.0	4.2
SSW							0	0.0	
SW			12.5				1	12.5	6.7
WSW	12.5		12.5				2	25.0	5.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	12.5	50.0	37.5				8		5.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	11.1			11.1			2	22.2	6.2
NNE		11.1					1	11.1	4.9
NE	11.1						1	11.1	2.8
ENE	22.2						2	22.2	1.9
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			11.1				1	11.1	9.2
SSW		22.2					2	22.2	3.7
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	44.4	33.3	11.1	11.1			9		4.5

100 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE				12.5			1	12.5	11.7
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	12.5		12.5				2	25.0	4.1
S		12.5					1	12.5	3.2
SSW					12.5		1	12.5	16.3
SW							0	0.0	
WSW	12.5		25.0				3	37.5	5.8
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	12.5	37.5	12.5	12.5		8		7.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		11.1	11.1				2	22.2	6.9
NE		11.1	11.1				2	22.2	6.8
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		11.1					1	11.1	3.2
S							0	0.0	
SSW				11.1			1	11.1	10.2
SW			11.1				1	11.1	8.9
WSW	11.1	11.1					2	22.2	3.1
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	44.4	33.3	11.1			9		6.2

200 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE				12.5			1	12.5	11.8
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			12.5				1	12.5	6.3
S		12.5	12.5				2	25.0	5.7
SSW	12.5						1	12.5	2.1
SW							0	0.0	
WSW	12.5		12.5	12.5			3	37.5	7.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	12.5	37.5	25.0			8		6.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			11.1				1	11.1	8.7
NE		11.1					1	11.1	4.7
ENE		11.1					1	11.1	4.3
E							0	0.0	
ESE	11.1						1	11.1	2.4
SE							0	0.0	
SSE		11.1					1	11.1	5.9
S							0	0.0	
SSW				11.1			1	11.1	10.9
SW	11.1			11.1			2	22.2	8.1
WSW							0	0.0	
W	11.1						1	11.1	2.6
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	33.3	11.1	22.2			9		5.7

300 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE				12.5			1	12.5	10.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S		12.5	25.0				3	37.5	6.3
SSW							0	0.0	
SW							0	0.0	
WSW	12.5	12.5		12.5			3	37.5	7.6
W		12.5					1	12.5	4.2
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	12.5	37.5	25.0	25.0			8		7.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			11.1				1	11.1	9.3
NE							0	0.0	
ENE							0	0.0	
E	22.2						2	22.2	1.8
ESE							0	0.0	
SE							0	0.0	
SSE			11.1				1	11.1	9.1
S			11.1				1	11.1	6.3
SSW		11.1					1	11.1	4.0
SW			11.1	11.1			2	22.2	9.3
WSW							0	0.0	
W		11.1					1	11.1	3.2
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	22.2	44.4	11.1			9		6.0

500 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			12.5				1	12.5	9.7
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S		12.5	12.5				2	25.0	6.2
SSW			12.5				1	12.5	7.2
SW							0	0.0	
WSW		12.5		12.5	12.5		3	37.5	10.6
W		12.5					1	12.5	4.8
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		37.5	37.5	12.5	12.5		8		8.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	6.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		22.2	11.1				3	33.3	5.7
S							0	0.0	
SSW			11.1				1	11.1	9.9
SW			11.1	11.1	11.1		3	33.3	14.0
WSW							0	0.0	
W							0	0.0	
WNW		11.1					1	11.1	3.4
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		33.3	44.4	11.1	11.1		9		8.7

750 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				14.2			1	14.2	12.2
NE							0	0.0	
ENE							0	0.0	
E		14.2					1	14.2	4.2
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW		14.2					1	14.2	5.8
SW			14.2				1	14.2	9.0
WSW					14.2		1	14.2	19.7
W	14.2						1	14.2	2.5
WNW				14.2			1	14.2	10.8
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	14.2	28.4	14.2	28.4	14.2		7		9.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE					14.2		1	14.2	17.3
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			14.2				1	14.2	6.6
SSW							0	0.0	
SW		14.2		14.2			2	28.4	9.9
WSW		14.2					1	14.2	4.4
W							0	0.0	
WNW		14.2			14.2		2	28.4	10.8
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		42.6	14.2	14.2	28.4		7		9.9

1500 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N				50.0			1	50.0	10.5
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW				50.0			1	50.0	10.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS				100.0			2		10.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	7.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		11.1					1	11.1	4.8
S							0	0.0	
SSW							0	0.0	
SW			11.1	11.1	11.1	11.1	4	44.4	16.1
WSW			11.1				1	11.1	6.2
W	11.1						1	11.1	1.6
WNW			11.1				1	11.1	7.2
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	11.1	44.4	11.1	11.1	11.1	9		10.1

1000 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N			16.6				1	16.6	6.8
NNE						16.6	1	16.6	29.3
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			16.6				1	16.6	6.6
SSW							0	0.0	
SW		16.6					1	16.6	5.1
WSW							0	0.0	
W		16.6					1	16.6	5.2
WNW				16.6			1	16.6	10.5
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		33.2	33.2	16.6		16.6	6		10.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE			25.0				1	25.0	6.0
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW			50.0	25.0			3	75.0	9.2
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			75.0	25.0			4		8.4

2000 METER LEVEL WINDS AFTERNOON SEPTEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N				100.0			1	100.0	10.8
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS				100.0			1		10.8

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF SEPTEMBER 1978 MORNING

THICKNESS (METERS)	********** INVERSION BASE HEIGHT (METERS) ********** SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	4.3	8.6	13.0	13.0	8.6				8.6			56.1
101-250	17.3			4.3	4.3	4.3						30.2
251-500	4.3		4.3									8.6
501-750	4.3											4.3
TOTAL	30.2	8.6	17.3	17.3	12.9	4.3			8.6			
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				23

INVERSION TYPE												
1	13.0			4.3	4.3				4.3			25.9
2	4.3		17.3	4.3		4.3			4.3			34.5
3	4.3	4.3		4.3	8.6							21.5
4	8.6	4.3		4.3								17.2
5												

MONTH OF SEPTEMBER 1978 AFTERNOON

THICKNESS (METERS)	********** INVERSION BASE HEIGHT (METERS) ********** SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100			12.5	12.5		12.5						37.5
101-250						12.5						12.5
251-500												
501-750												
TOTAL			12.5	12.5		25.0						
NO INVERSION												50.0
								TOTAL NO. OF OCCURENCES				4

INVERSION TYPE												
1						50.0						50.0
2			25.0									25.0
3				25.0								25.0
4												
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR SEPTEMBER 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	4	0
101- 250	1	0
251- 500	1	0
501- 750	0	0
751-1000	1	1
1001-1500	0	1
>1500	2	5
TOTAL	9	7
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	6.2	8.0
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.80	-01.56

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING OCTOBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	12.5						2	12.5	.8
NNE	25.0						4	25.0	1.1
NE	6.2						1	6.2	.4
ENE	6.2						1	6.2	1.8
E	6.2						1	6.2	1.3
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S		6.2					1	6.2	5.4
SSW		6.2					1	6.2	3.3
SW	12.5						2	12.5	.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	6.2						1	6.2	2.2
NNW	6.2						1	6.2	.7
CALM							1	6.0	
COL. TOTALS	81.0	12.4					16		1.4

SURFACE WINDS AFTERNOON OCTOBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	2.9
NE							0	0.0	
ENE	8.3						1	8.3	.7
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.7
SSE	16.6	25.0					5	41.6	2.7
S	8.3						1	8.3	2.9
SSW	25.0						3	25.0	1.8
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	74.8	25.0					12		2.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	18.7	18.7	6.2				7	43.6	3.5
NE		6.2					1	6.2	4.5
ENE	6.2						1	6.2	1.5
E							0	0.0	
ESE	6.2						1	6.2	1.0
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW			6.2				1	6.2	7.2
SW		6.2	6.2				2	12.4	5.4
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	6.2						1	6.2	.1
NNW	6.2	6.2					2	12.4	3.3
CALM							0	0.0	
COL. TOTALS	43.5	37.3	18.6				16		3.5

100 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	8.3						1	8.3	1.4
E	8.3						1	8.3	.8
ESE							0	0.0	
SE	8.3						1	8.3	2.4
SSE	25.0	16.6					5	41.6	2.7
S	16.6						2	16.6	2.1
SSW	8.3	8.3					2	16.6	3.2
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	74.8	24.9					12		2.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		6.2	12.5				3	18.7	6.0
NNE		6.2	6.2				2	12.4	4.7
NE		6.2					1	6.2	4.5
ENE	6.2						1	6.2	.9
E	6.2						1	6.2	2.8
ESE							0	0.0	
SE	6.2						1	6.2	2.5
SSE	6.2						1	6.2	1.7
S		6.2					1	6.2	4.3
SSW	6.2	6.2					2	12.4	3.1
SW			6.2	6.2			2	12.4	12.1
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	6.2						1	6.2	2.0
CALM							0	0.0	
COL. TOTALS	37.2	31.0	24.9	6.2			16		4.7

200 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	16.6						2	16.6	1.4
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	25.0	8.3					4	33.3	3.0
S	8.3	25.0					4	33.3	3.7
SSW	8.3	8.3					2	16.6	3.3
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	58.2	41.6					12		3.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		12.5	6.2				3	18.7	5.6
NNE		6.2	6.2				2	12.4	5.7
NE		6.2					1	6.2	3.3
ENE							0	0.0	
E							0	0.0	
ESE		6.2					1	6.2	3.9
SE		6.2					1	6.2	5.5
SSE		6.2	6.2				2	12.4	5.9
S		12.5					2	12.5	3.8
SSW		6.2					1	6.2	3.9
SW				6.2			1	6.2	15.0
WSW				6.2			1	6.2	10.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW		6.2					1	6.2	3.8
CALM							0	0.0	
COL. TOTALS		68.4	18.6	12.4			16		5.6

300 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	8.3						1	8.3	1.1
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.9
SSE		16.6					2	16.6	4.2
S	33.3	16.6					6	49.9	2.3
SSW							0	0.0	
SW	8.3	8.3					2	16.6	3.3
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	58.2	41.5					12		2.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N			6.2				1	6.2	6.3
NNE			12.5				2	12.5	7.8
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			6.2				1	6.2	7.0
SSE		6.2	18.7				4	24.9	6.9
S	6.2						1	6.2	2.8
SSW		6.2					1	6.2	5.5
SW						6.2	1	6.2	33.2
WSW	6.2						1	6.2	.7
W		6.2					1	6.2	5.4
WNW	6.2						1	6.2	2.7
NW							0	0.0	
NNW	6.2	6.2					2	12.4	2.9
CALM							0	0.0	
COL. TOTALS	24.8	24.8	43.6			6.2	16		7.0

500 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	8.3						1	8.3	1.0
SE							0	0.0	
SSE		16.6		8.3			3	24.9	6.8
S		16.6	16.6				4	33.2	6.2
SSW							0	0.0	
SW			8.3				1	8.3	6.9
WSW	8.3						1	8.3	1.9
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	8.3						1	8.3	.3
CALM							0	0.0	
COL. TOTALS	33.2	33.2	24.9	8.3			12		4.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		7.1					1	7.1	3.7
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E	7.1						1	7.1	1.9
ESE							0	0.0	
SE		7.1					1	7.1	5.1
SSE		14.2					2	14.2	5.2
S	7.1		7.1				2	14.2	4.5
SSW	7.1	14.2					3	21.3	3.9
SW		7.1					1	7.1	3.1
WSW		7.1					1	7.1	5.2
W							0	0.0	
WNW			7.1				1	7.1	6.9
NW			7.1				1	7.1	8.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	21.3	56.8	21.3				14		4.7

750 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	16.6						2	16.6	1.6
SSE							0	0.0	
S		8.3	16.6				3	24.9	5.5
SSW	8.3	8.3	8.3				3	24.9	4.4
SW	8.3	8.3	8.3				3	24.9	4.4
WSW	8.3						1	8.3	1.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	24.9	33.2				12		4.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	9.0	9.0					2	18.0	1.8
SSW	9.0	18.1					3	27.1	3.8
SW		9.0	9.0				2	18.0	5.8
WSW	9.0						1	9.0	1.8
W		9.0	9.0				2	18.0	4.7
WNW			9.0				1	9.0	6.5
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	45.1	27.0				11		4.0

1000 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N				8.3			1	8.3	12.6
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.4
SSE							0	0.0	
S			8.3				1	8.3	8.1
SSW				8.3			1	8.3	13.3
SW	8.3	8.3	16.6				4	33.2	5.7
WSW		8.3					1	8.3	4.5
W		16.6					2	16.6	5.3
WNW	8.3						1	8.3	.5
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	24.9	33.2	24.9	16.6			12		6.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	11.1						1	11.1	2.6
SSW							0	0.0	
SW		11.1	11.1		11.1		3	33.3	9.6
WSW	11.1		11.1				2	22.2	3.6
W			11.1	11.1			2	22.2	8.3
WNW			11.1				1	11.1	7.9
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	11.1	44.4	11.1	11.1		9		7.0

1500 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW			11.1	11.1			2	22.2	10.4
W	11.1			11.1			2	22.2	6.1
WNW		11.1	44.4				5	55.5	7.6
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	11.1	55.5	22.2			9		7.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		28.5					2	28.5	3.3
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			14.2	14.2			2	28.4	9.5
WNW				14.2	14.2		2	28.4	13.3
NW			14.2				1	14.2	7.6
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		28.5	28.4	28.4	14.2		7		8.5

2000 METER LEVEL WINDS AFTERNOON OCTOBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW		12.5					1	12.5	5.5
W			12.5				1	12.5	7.0
WNW				37.5			3	37.5	12.8
NW		12.5					1	12.5	5.4
NNW			25.0				2	25.0	8.0
CALM							0	0.0	
COL. TOTALS		25.0	37.5	37.5			8		9.0

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF OCTOBER 1978 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	8.8	2.2		6.6	11.1	6.6	2.2	4.4	2.2			44.1
101-250	4.4	4.4	2.2	6.6	4.4	4.4	2.2	6.6	6.6	2.2		44.0
251-500	8.8			2.2								11.0
501-750												
TOTAL	22.0	6.6	2.2	15.4	15.5	11.0	4.4	11.0	8.8	2.2		
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				45

INVERSION TYPE												
1				2.2	6.6	4.4	2.2	2.2	2.2	2.2		22.0
2	2.2			8.8	4.4	4.4	2.2	6.6	2.2			30.8
3	8.8	2.2		4.4	2.2	2.2		2.2	4.4			26.4
4	11.1	4.4	2.2		2.2							19.9
5												

MONTH OF OCTOBER 1978 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100					5.8	5.8	11.7		5.8	17.6		46.7
101-250				11.7		5.8		5.8	5.8			29.1
251-500								5.8	5.8			11.6
501-750												
TOTAL				11.7	5.8	11.6	11.7	11.6	17.4	17.6		
NO INVERSION												11.0
								TOTAL NO. OF OCCURENCES				15

INVERSION TYPE												
1									6.6	20.0		26.6
2				13.3	6.6	6.6	13.3	13.3	13.3			66.4
3						6.6						6.6
4												
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR OCTOBER 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	9	0
101- 250	2	0
251- 500	1	0
501- 750	1	3
751-1000	0	1
1001-1500	0	3
>1500	0	1
TOTAL	13	8
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.3	4.9
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-01.12	-01.23

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		8.3					1	8.3	3.6
NNE							0	0.0	
NE	8.3						1	8.3	1.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.8
SSE	8.3	16.6					3	24.9	4.2
S	8.3						1	8.3	.4
SSW		8.3					1	8.3	3.6
SW	8.3						1	8.3	.4
WSW							0	0.0	
W	8.3						1	8.3	1.1
WNW	8.3						1	8.3	.4
NW							0	0.0	
NNW	8.3						1	8.3	.7
CALM							0	0.0	
COL. TOTALS	66.4	33.2					12		2.1

SURFACE WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		11.1					1	11.1	5.1
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	11.1	22.2					3	33.3	3.9
S	33.3	11.1					4	44.4	2.0
SSW							0	0.0	
SW							0	0.0	
WSW	11.1						1	11.1	.7
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	55.5	44.4					9		2.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3			8.3			2	16.6	6.2
NE	8.3						1	8.3	.3
ENE	8.3						1	8.3	1.8
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.0
SSE		8.3	16.6				3	24.9	7.3
S							0	0.0	
SSW			8.3				1	8.3	6.1
SW							0	0.0	
WSW							0	0.0	
W		8.3					1	8.3	3.7
WNW							0	0.0	
NW							0	0.0	
NNW	8.3						1	8.3	2.1
CALM							1	8.0	
COL. TOTALS	41.5	16.6	24.9	8.3			12		4.2

100 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	7.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	44.4		11.1				5	55.5	2.6
S		11.1		11.1			2	22.2	9.0
SSW	11.1						1	11.1	.9
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	55.5	11.1	22.2	11.1			9		4.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			8.3				1	8.3	7.5
NE	8.3						1	8.3	.8
ENE	8.3						1	8.3	2.8
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	.3
SSE	8.3			8.3			2	16.6	6.3
S	8.3	16.6		8.3			4	33.2	5.5
SSW							0	0.0	
SW		8.3					1	8.3	5.8
WSW							0	0.0	
W	8.3						1	8.3	2.3
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	49.8	24.9	8.3	16.6			12		4.5

200 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		11.1					1	11.1	3.5
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	22.2	22.2	33.3				7	77.7	4.4
S	11.1						1	11.1	1.3
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	33.3	33.3				9		3.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				8.3			1	8.3	11.9
NE	8.3						1	8.3	.8
ENE							0	0.0	
E	8.3						1	8.3	1.4
ESE	8.3						1	8.3	1.6
SE							0	0.0	
SSE	8.3						1	8.3	1.2
S		8.3		8.3	8.3		3	24.9	10.8
SSW		8.3	8.3				2	16.6	5.9
SW	8.3						1	8.3	.7
WSW		8.3					1	8.3	3.3
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	24.9	8.3	16.6	8.3		12		5.4

300 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	8.5
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	22.2						2	22.2	1.2
SSE	11.1	33.3					4	44.4	3.6
S				11.1			1	11.1	10.4
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	11.1						1	11.1	.8
CALM							0	0.0	
COL. TOTALS	44.4	33.3	11.1	11.1			9		4.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				8.3			1	8.3	14.3
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.4
SSE		8.3					1	8.3	4.9
S		8.3		8.3			2	16.6	9.9
SSW	16.6	8.3			8.3		4	33.2	7.5
SW			8.3				1	8.3	8.8
WSW		8.3					1	8.3	5.4
W							0	0.0	
WNW				8.3			1	8.3	11.4
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	24.9	33.2	8.3	24.9	8.3		12		8.0

500 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE					11.1		1	11.1	17.2
ENE	11.1						1	11.1	.9
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		22.2	22.2				4	44.4	5.7
S		11.1	11.1				2	22.2	6.3
SSW							0	0.0	
SW				11.1			1	11.1	10.1
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	33.3	33.3	11.1	11.1		9		7.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	8.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			11.1				1	11.1	7.3
S		11.1					1	11.1	3.2
SSW						11.1	1	11.1	27.2
SW		11.1		11.1			2	22.2	7.2
WSW			11.1				1	11.1	6.3
W			11.1				1	11.1	6.7
WNW							0	0.0	
NW							0	0.0	
NNW	11.1						1	11.1	1.5
CALM							0	0.0	
COL. TOTALS	11.1	22.2	44.4	11.1		11.1	9		8.3

750 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	6.7
ENE			11.1				1	11.1	6.8
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		11.1					1	11.1	4.9
S			22.2				2	22.2	6.1
SSW	11.1						1	11.1	.7
SW		22.2					2	22.2	4.0
WSW			11.1				1	11.1	7.2
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	33.3	55.5				9		5.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	7.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE				11.1			1	11.1	11.5
S							0	0.0	
SSW	11.1						1	11.1	.9
SW			11.1				1	11.1	8.8
WSW		11.1			11.1		2	22.2	10.8
W	11.1			11.1			2	22.2	6.5
WNW				11.1			1	11.1	13.8
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	11.1	22.2	33.3	11.1		9		8.5

1000 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	12.5	12.5		12.5			3	37.5	5.3
SSW	12.5						1	12.5	1.9
SW		25.0	12.5				3	37.5	6.0
WSW							0	0.0	
W							0	0.0	
WNW		12.5					1	12.5	4.9
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0	12.5	12.5			8		5.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		14.2					1	14.2	3.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE			14.2				1	14.2	7.3
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW					28.5		2	28.5	17.0
W							0	0.0	
WNW		14.2	14.2				2	28.4	7.4
NW							0	0.0	
NNW	14.2						1	14.2	2.1
CALM							0	0.0	
COL. TOTALS	14.2	28.4	28.4		28.5		7		8.9

1500 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE				14.2			1	14.2	12.0
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	14.2						1	14.2	.8
S							0	0.0	
SSW					14.2		1	14.2	16.1
SW			14.2				1	14.2	8.1
WSW							0	0.0	
W		14.2					1	14.2	5.3
WNW			14.2				1	14.2	9.4
NW							0	0.0	
NNW	14.2						1	14.2	1.1
CALM							0	0.0	
COL. TOTALS	28.4	14.2	28.4	14.2	14.2		7		7.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING NOVEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W					50.0		1	50.0	16.3
WNW					50.0		1	50.0	22.1
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS					100.0		2		19.2

2000 METER LEVEL WINDS AFTERNOON NOVEMBER,1978

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE			25.0				1	25.0	7.9
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW				25.0			1	25.0	10.9
W		25.0		25.0			2	50.0	8.6
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		25.0	25.0	50.0			4		9.0

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

MONTH OF NOVEMBER 1978 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	2.9	2.9	5.8	2.9		2.9	2.9		2.9			23.2
101-250	8.8	2.9		5.8	2.9		5.8	2.9	5.8	5.8		40.7
251-500	2.9				8.8	2.9		8.8				23.4
501-750							2.9		2.9			5.8
TOTAL	14.6	5.8	5.8	8.7	11.7	5.8	11.6	11.7	11.6	5.8		
NO INVERSION												5.8
								TOTAL NO. OF OCCURENCES				34

INVERSION TYPE											
1			3.1	3.1	6.2		6.2	6.2	6.2	6.2	37.2
2		6.2		6.2	3.1			3.1	3.1		21.7
3	3.1		3.1		3.1	6.2	6.2	3.1	3.1		27.9
4	12.5										12.5
5											

MONTH OF NOVEMBER 1978 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100				5.0	15.0	10.0						30.0
101-250		5.0		5.0		5.0	15.0	5.0	5.0			40.0
251-500								10.0	5.0	5.0		20.0
501-750												
TOTAL		5.0		10.0	15.0	15.0	15.0	15.0	10.0	5.0		
NO INVERSION												10.0
								TOTAL NO. OF OCCURENCES				18

INVERSION TYPE											
1		5.5			5.5	5.5	11.1	11.1	5.5		44.2
2					5.5	5.5	5.5	5.5			22.0
3				11.1	5.5				5.5	5.5	27.6
4						5.5					5.5
5											

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR NOVEMBER 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	5	0
101- 250	1	0
251- 500	1	2
501- 750	1	0
751-1000	1	1
1001-1500	1	1
>1500	2	4
TOTAL	12	8
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	4.6	4.8
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.71	-01.35

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	11.1						1	11.1	.4
NNE		11.1					1	11.1	5.1
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		11.1	11.1				2	22.2	6.0
SSE	11.1						1	11.1	2.9
S							0	0.0	
SSW	22.2						2	22.2	2.1
SW		11.1					1	11.1	5.4
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	11.1						1	11.1	.9
CALM							0	0.0	
COL. TOTALS	55.5	33.3	11.1				9		3.4

SURFACE WINDS AFTERNOON DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		11.1					1	11.1	4.0
NNE	22.2						2	22.2	1.0
NE	11.1		11.1				2	22.2	4.7
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	11.1						1	11.1	1.3
SSE	11.1						1	11.1	1.1
S							0	0.0	
SSW	11.1						1	11.1	.7
SW							0	0.0	
WSW		11.1					1	11.1	4.0
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	66.6	22.2	11.1				9		2.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	11.1	11.1					2	22.2	2.8
NNE							0	0.0	
NE			11.1				1	11.1	6.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		11.1		11.1	11.1		3	33.3	11.4
S							0	0.0	
SSW		11.1					1	11.1	4.6
SW		11.1					1	11.1	4.7
WSW							0	0.0	
W							0	0.0	
WNW	11.1						1	11.1	2.5
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	44.4	11.1	11.1	11.1		9		6.4

100 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		22.2	22.2				4	44.4	6.9
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	11.1						1	11.1	1.8
S	22.2						2	22.2	1.5
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			11.1				1	11.1	6.3
WNW							0	0.0	
NW							0	0.0	
NNW	11.1						1	11.1	1.5
CALM							0	0.0	
COL. TOTALS	44.4	22.2	33.3				9		4.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			11.1				1	11.1	6.9
NE		11.1					1	11.1	4.6
ENE	11.1						1	11.1	2.7
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE				11.1			1	11.1	13.4
S		11.1	11.1				2	22.2	5.3
SSW		11.1					1	11.1	3.7
SW			11.1				1	11.1	8.4
WSW			11.1				1	11.1	6.3
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	33.3	44.4	11.1			9		6.2

200 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND ********** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	11.1						1	11.1	.9
NNE		11.1					1	11.1	4.0
NE		11.1	11.1	11.1			3	33.3	7.9
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S		11.1					1	11.1	3.1
SSW							0	0.0	
SW	11.1						1	11.1	.2
WSW							0	0.0	
W			11.1				1	11.1	7.2
WNW							0	0.0	
NW	11.1						1	11.1	.7
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	33.3	22.2	11.1			9		4.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			11.1				1	11.1	9.4
NE							0	0.0	
ENE		11.1					1	11.1	3.1
E							0	0.0	
ESE		11.1					1	11.1	5.9
SE							0	0.0	
SSE				11.1			1	11.1	12.3
S			22.2				2	22.2	6.7
SSW		11.1					1	11.1	4.2
SW			11.1				1	11.1	7.6
WSW			11.1				1	11.1	7.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		33.3	55.5	11.1			9		7.0

300 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			11.1				1	11.1	6.8
NE		11.1	11.1				2	22.2	5.9
ENE	11.1		11.1				2	22.2	4.3
E							0	0.0	
ESE		11.1					1	11.1	3.3
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW	11.1						1	11.1	1.5
W				11.1			1	11.1	13.6
WNW							0	0.0	
NW		11.1					1	11.1	4.2
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	33.3	33.3	11.1			9		5.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				11.1			1	11.1	10.4
NE							0	0.0	
ENE							0	0.0	
E	11.1						1	11.1	2.6
ESE							0	0.0	
SE				11.1			1	11.1	10.6
SSE							0	0.0	
S			11.1				1	11.1	9.2
SSW		11.1					1	11.1	3.7
SW		11.1	11.1				2	22.2	6.0
WSW		11.1					1	11.1	5.7
W			11.1				1	11.1	7.3
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	33.3	33.3	22.2			9		6.8

500 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		11.1		11.1			2	22.2	7.7
NE	11.1			11.1			2	22.2	6.3
ENE							0	0.0	
E							0	0.0	
ESE		11.1					1	11.1	5.1
SE							0	0.0	
SSE		11.1					1	11.1	3.2
S		11.1					1	11.1	3.4
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW			11.1				1	11.1	9.9
NW			11.1				1	11.1	8.1
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	44.4	22.2	22.2			9		6.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE				12.5			1	12.5	13.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			12.5				1	12.5	8.1
SSE							0	0.0	
S							0	0.0	
SSW		12.5					1	12.5	5.6
SW			12.5				1	12.5	8.3
WSW		25.0	12.5				3	37.5	5.7
W				12.5			1	12.5	10.0
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		37.5	37.5	25.0			8		7.7

750 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			16.6				1	16.6	7.4
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			16.6				1	16.6	9.8
S	16.6						1	16.6	2.8
SSW	16.6	16.6					2	33.2	3.0
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW			16.6				1	16.6	8.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	16.6	49.8				6		5.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE			20.0				1	20.0	6.2
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW			40.0				2	40.0	7.2
W		20.0					1	20.0	4.3
WNW				20.0			1	20.0	10.3
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		20.0	60.0	20.0			5		7.0

1000 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE		20.0					1	20.0	3.8
SE							0	0.0	
SSE							0	0.0	
S			20.0				1	20.0	9.9
SSW		20.0					1	20.0	3.0
SW							0	0.0	
WSW			20.0				1	20.0	8.4
W							0	0.0	
WNW							0	0.0	
NW			20.0				1	20.0	6.4
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		40.0	60.0				5		6.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E			50.0				1	50.0	6.6
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			50.0				1	50.0	9.6
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			100.0				2		8.1

1500 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE				25.0			1	25.0	11.7
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW		25.0	25.0				2	50.0	6.2
W							0	0.0	
WNW							0	0.0	
NW						25.0	1	25.0	25.3
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		25.0	25.0	25.0		25.0	4		12.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS							0		

2000 METER LEVEL WINDS AFTERNOON DECEMBER,1978

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			100.0				1	100.0	6.1
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			100.0				1		6.1

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF DECEMBER 1978 MORNING

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	**********			INVERSION BASE HEIGHT (METERS)								**********
001-100	15.7		10.5	10.5	5.2	10.5	5.2	10.5	5.2			73.3
101-250	10.5			5.2								15.7
251-500							5.2					5.2
501-750												
TOTAL	26.2		10.5	15.7	5.2	10.5	10.4	10.5	5.2			
NO INVERSION												5.0
								TOTAL NO. OF OCCURENCES				18

INVERSION TYPE											
1			5.5	5.5		5.5	5.5	5.5			27.5
2	5.5			5.5		5.5	5.5	5.5			27.5
3			5.5		5.5						11.0
4	16.6			5.5							22.1
5	5.5								5.5		11.0

MONTH OF DECEMBER 1978 AFTERNOON

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	**********			INVERSION BASE HEIGHT (METERS)								**********
001-100		15.3					7.6		7.6			30.5
101-250			15.3	7.6		7.6	7.6					38.1
251-500						7.6						7.6
501-750												
TOTAL		15.3	15.3	7.6		15.2	15.2		7.6			
NO INVERSION												23.0
								TOTAL NO. OF OCCURENCES				10

INVERSION TYPE											
1						10.0			10.0		20.0
2			20.0				10.0				30.0
3				10.0		10.0	10.0				30.0
4		20.0									20.0
5											

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR DECEMBER 1978

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	4	0
101- 250	0	5
251- 500	0	0
501- 750	0	0
751-1000	1	0
1001-1500	1	0
>1500	2	2
TOTAL	8	7

AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	4.4	4.7
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.95	-01.03

****

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	25.0	12.5					3	37.5	2.0
NNE		12.5					1	12.5	4.2
NE							0	0.0	
ENE							0	0.0	
E	12.5						1	12.5	.7
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW	12.5						1	12.5	.7
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	12.5						1	12.5	.4
NNW	12.5						1	12.5	2.5
CALM							0	0.0	
COL. TOTALS	75.0	25.0					8		1.8

SURFACE WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	16.6						2	16.6	.6
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	41.6						5	41.6	1.1
SSW	16.6						2	16.6	1.5
SW	8.3						1	8.3	1.4
WSW	8.3						1	8.3	.7
W							0	0.0	
WNW							0	0.0	
NW	8.3						1	8.3	.2
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	99.7						12		1.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		12.5					1	12.5	5.8
NNE			12.5				1	12.5	5.7
NE	12.5	12.5					2	25.0	3.2
ENE		12.5					1	12.5	5.0
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	12.5						1	12.5	1.7
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	12.5						1	12.5	.5
WNW							0	0.0	
NW							0	0.0	
NNW	12.5						1	12.5	1.9
CALM							0	0.0	
COL. TOTALS	50.0	37.5	12.5				8		3.8

100 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	8.3						1	8.3	2.4
E	16.6						2	16.6	1.2
ESE							0	0.0	
SE	8.3						1	8.3	.5
SSE							0	0.0	
S	16.6	25.0					5	41.6	2.4
SSW	16.6						2	16.6	1.4
SW	8.3						1	8.3	.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	74.7	25.0					12		1.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			12.5	12.5			2	25.0	10.3
NE		12.5					1	12.5	3.7
ENE		12.5					1	12.5	5.7
E							0	0.0	
ESE							0	0.0	
SE	12.5						1	12.5	1.2
SSE		25.0					2	25.0	4.4
S	12.5						1	12.5	.1
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	25.0	50.0	12.5	12.5			8		5.0

200 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	1.2
NE	8.3	8.3					2	16.6	3.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.4
SSE		16.6					2	16.6	4.7
S							0	0.0	
SSW	16.6						2	16.6	1.0
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	16.6						2	16.6	1.0
NNW	16.6						2	16.6	.6
CALM							0	0.0	
COL. TOTALS	74.7	24.9					12		1.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				14.2			1	14.2	14.0
NE		14.2					1	14.2	3.1
ENE		14.2					1	14.2	4.0
E	14.2						1	14.2	.2
ESE	14.2						1	14.2	1.4
SE							0	0.0	
SSE			14.2				1	14.2	9.0
S		14.2					1	14.2	4.0
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	28.4	42.6	14.2	14.2			7		5.1

300 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		16.6					2	16.6	3.4
NE		8.3					1	8.3	3.1
ENE							0	0.0	
E	8.3						1	8.3	1.5
ESE							0	0.0	
SE							0	0.0	
SSE		16.6					2	16.6	4.5
S	8.3	8.3					2	16.6	2.7
SSW	16.6						2	16.6	1.3
SW							0	0.0	
WSW	8.3						1	8.3	.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	8.3						1	8.3	2.5
CALM							0	0.0	
COL. TOTALS	49.8	49.8					12		2.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			16.6				1	16.6	7.8
NE							0	0.0	
ENE							0	0.0	
E	50.0						3	50.0	2.4
ESE							0	0.0	
SE							0	0.0	
SSE			16.6				1	16.6	8.0
S							0	0.0	
SSW		16.6					1	16.6	5.1
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	50.0	16.6	33.2				6		4.7

500 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	16.6		8.3				3	24.9	4.0
NE		8.3					1	8.3	5.7
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	1.5
SSE	8.3	16.6	16.6				5	41.5	4.3
S							0	0.0	
SSW	8.3						1	8.3	.8
SW							0	0.0	
WSW		8.3					1	8.3	4.8
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	33.2	24.9				12		3.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			20.0				1	20.0	9.0
NE							0	0.0	
ENE							0	0.0	
E	20.0						1	20.0	2.0
ESE							0	0.0	
SE							0	0.0	
SSE			20.0				1	20.0	9.4
S			20.0				1	20.0	7.9
SSW							0	0.0	
SW			20.0				1	20.0	6.7
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0		80.0				5		7.0

750 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	8.3	8.3					2	16.6	2.0
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	16.6	8.3	8.3				4	33.2	3.1
S							0	0.0	
SSW		8.3					1	8.3	4.3
SW		16.6					2	16.6	3.4
WSW		8.3					1	8.3	4.9
W							0	0.0	
WNW		8.3					1	8.3	4.9
NW	8.3						1	8.3	1.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	58.1	8.3				12		3.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		33.3					1	33.3	3.4
S							0	0.0	
SSW	33.3						1	33.3	1.8
SW			33.3				1	33.3	6.5
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	33.3	33.3				3		3.9

1000 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		9.0					1	9.0	3.7
S		18.1					2	18.1	4.5
SSW							0	0.0	
SW	9.0	9.0					2	18.0	3.2
WSW	9.0	18.1	9.0				4	36.1	4.3
W	9.0	9.0					2	18.0	2.9
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	63.2	9.0				11		3.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW		100.0					1	100.0	4.8
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		100.0					1		4.8

1500 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		10.0					1	10.0	5.3
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW	10.0						1	10.0	2.5
SW	10.0						1	10.0	1.5
WSW				10.0			1	10.0	11.4
W		20.0	10.0				3	30.0	5.4
WNW		10.0	10.0				2	20.0	5.2
NW			10.0				1	10.0	6.3
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	40.0	30.0	10.0			10		5.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING JANUARY,1979

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS							0		

2000 METER LEVEL WINDS AFTERNOON JANUARY,1979

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W		20.0	20.0				2	40.0	5.8
WNW			20.0				1	20.0	6.5
NW			40.0				2	40.0	7.6
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		20.0	80.0				5		6.6

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF JANUARY 1979 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	4.5		4.5	4.5		4.5	4.5					22.5
101-250	4.5		4.5	13.6	13.6		9.0		9.0			54.2
251-500	4.5	9.0					4.5	4.5				22.5
501-750												
TOTAL	13.5	9.0	9.0	18.1	13.6	4.5	18.0	4.5	9.0			
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				22
INVERSION TYPE												
1				4.5		4.5	9.0		4.5			22.5
2		4.5	9.0	9.0	4.5		4.5		4.5			36.0
3	13.6	4.5					4.5	4.5				27.1
4				4.5	9.0							13.5
5												

MONTH OF JANUARY 1979 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100		4.1		4.1	8.3			8.3	4.1			28.9
101-250	16.6			20.8				12.5				49.9
251-500		8.3					4.1	4.1				16.5
501-750					4.1							4.1
TOTAL	16.6	12.4		24.9	12.4		4.1	24.9	4.1			
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				24
INVERSION TYPE												
1	8.3			8.3								16.6
2	4.1	4.1		4.1				8.3	4.1			24.7
3	4.1	8.3		8.3	12.5		4.1	12.5				49.8
4				4.1				4.1				8.2
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR JANUARY 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	2	0
101- 250	2	3
251- 500	3	3
501- 750	0	0
751-1000	0	0
1001-1500	0	0
>1500	0	0
TOTAL	7	6
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.1	2.0
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.85	-00.74

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING FEBRUARY,1979

DIRECTION	******** WIND SPEEDS METERS/SECOND ******** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	22.2						2	22.2	1.5
NNE	11.1	11.1					2	22.2	2.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		11.1					1	11.1	4.4
SSE	11.1	22.2					3	33.3	3.3
S		11.1					1	11.1	3.1
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	44.4	55.5					9		2.9

SURFACE WINDS AFTERNOON FEBRUARY,1979

DIRECTION	******** WIND SPEEDS METERS/SECOND ******** 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	9.2
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	11.1	11.1					2	22.2	3.6
SSE		11.1					1	11.1	5.1
S	11.1	11.1					2	22.2	3.1
SSW	11.1						1	11.1	.7
SW	11.1						1	11.1	1.7
WSW							0	0.0	
W							0	0.0	
WNW	11.1						1	11.1	1.0
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	55.5	33.3	11.1				9		3.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	11.1						1	11.1	1.1
NNE		11.1	11.1				2	22.2	4.8
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	11.1						1	11.1	.7
SE							0	0.0	
SSE		11.1	33.3				4	44.4	6.9
S							0	0.0	
SSW	11.1						1	11.1	2.9
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	22.2	44.4				9		4.6

100 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	11.1			11.1			2	22.2	6.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		44.4	11.1				5	55.5	6.0
S							0	0.0	
SSW	22.2						2	22.2	2.1
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	44.4	11.1	11.1			9		5.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			11.1				1	11.1	6.5
ENE	11.1						1	11.1	2.1
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	11.1			22.2			3	33.3	7.5
S	22.2						2	22.2	2.5
SSW			11.1				1	11.1	6.7
SW							0	0.0	
WSW							0	0.0	
W	11.1						1	11.1	1.9
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	55.5		22.2	22.2			9		4.9

200 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		11.1					1	11.1	3.2
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	11.1						1	11.1	1.7
SE		11.1					1	11.1	4.5
SSE		22.2	33.3	11.1			6	66.6	6.9
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	44.4	33.3	11.1			9		5.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********							
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TC 15.9	16.0 TC 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E	11.1						1	11.1	2.9
ESE							0	0.0	
SE							0	0.0	
SSE	11.1			22.2			3	33.3	8.2
S		11.1	11.1				2	22.2	5.9
SSW							0	0.0	
SW			22.2				2	22.2	6.2
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	11.1						1	11.1	.9
CALM							0	0.0	
COL. TOTALS	33.3	11.1	33.3	22.2			9		5.8

300 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********							
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TC 15.9	16.0 TC 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	11.1						1	11.1	2.1
SE							0	0.0	
SSE		22.2		11.1			3	33.3	7.2
S			33.3	11.1			4	44.4	8.7
SSW							0	0.0	
SW							0	0.0	
WSW	11.1						1	11.1	2.8
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	22.2	33.3	22.2			9		6.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********							
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TC 15.9	16.0 TC 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	11.1						1	11.1	2.2
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			11.1				1	11.1	6.2
SSE		11.1					1	11.1	3.6
S			22.2				2	22.2	7.3
SSW	22.2						2	22.2	2.3
SW			11.1				1	11.1	9.9
WSW							0	0.0	
W		11.1					1	11.1	4.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	22.2	44.4				9		5.0

500 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********							
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TC 15.9	16.0 TC 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N			11.1				1	11.1	6.6
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		11.1	33.3				4	44.4	6.4
S			44.4				4	44.4	7.9
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		11.1	88.8				9		7.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		12.5					1	12.5	5.0
S							0	0.0	
SSW			12.5				1	12.5	9.7
SW		12.5	12.5	12.5			3	37.5	8.7
WSW	12.5	25.0					3	37.5	3.5
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	12.5	50.0	25.0	12.5			8		6.4

750 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			33.3	22.2			5	55.5	8.7
SSW							0	0.0	
SW		11.1	11.1				2	22.2	6.7
WSW		11.1					1	11.1	5.9
W							0	0.0	
WNW							0	0.0	
NW		11.1					1	11.1	5.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		33.3	44.4	22.2			9		7.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			16.6				1	16.6	9.9
SSW							0	0.0	
SW			16.6	16.6			2	33.2	9.2
WSW			16.6	33.3			3	49.9	11.1
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			49.8	49.9			6		10.2

1000 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S				14.2			1	14.2	11.6
SSW		14.2	14.2				2	28.4	6.5
SW		14.2					1	14.2	5.7
WSW		14.2	14.2				2	28.4	6.1
W							0	0.0	
WNW	14.2						1	14.2	2.9
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	14.2	42.6	28.4	14.2			7		6.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW				25.0			1	25.0	10.1
WSW		25.0				25.0	2	50.0	30.7
W			25.0				1	25.0	9.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		25.0	25.0	25.0		25.0	4		20.3

1500 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		20.0					1	20.0	3.3
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S				20.0			1	20.0	12.0
SSW							0	0.0	
SW		20.0					1	20.0	4.8
WSW			20.0				1	20.0	6.1
W					20.0		1	20.0	17.1
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		40.0	20.0	20.0	20.0		5		8.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW				33.3			1	33.3	15.8
WSW				33.3			1	33.3	11.3
W				33.3			1	33.3	14.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS				99.9			3		13.9

2000 METER LEVEL WINDS AFTERNOON FEBRUARY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W				100.0			1	100.0	11.8
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS				100.0			1		11.8

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF FEBRUARY 1979 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	17.3	13.0	13.0	17.3	4.3							64.9
001-250	4.3		4.3		4.3	8.6		8.6				30.1
251-500				4.3								4.3
001-750												
TOTAL	21.6	13.0	17.3	21.6	8.6	8.6		8.6				
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				23
INVERSION TYPE												
1				4.3								4.3
2	8.6	4.3	4.3	8.6	4.3	4.3						34.4
3	13.0	8.6	8.6	8.6	4.3	4.3		8.6				56.0
4			4.3									4.3
5												

MONTH OF FEBRUARY 1979 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	6.2	6.2	12.5	6.2			12.5					43.6
001-250	18.7		6.2	6.2			6.2	6.2				43.5
251-500												
001-750												
TOTAL	24.9	6.2	18.7	12.4			18.7	6.2				
NO INVERSION												12.0
								TOTAL NO. OF OCCURENCES				14
INVERSION TYPE												
1	14.2		7.1				14.2					35.5
2	7.1						7.1	7.1				21.3
3	7.1		14.2	14.2								35.5
4		7.1										7.1
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR FEBRUARY 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	0	0
101- 250	1	4
251- 500	6	2
501- 750	0	0
751-1000	0	0
1001-1500	0	0
>1500	2	1
TOTAL	9	7
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	4.9	5.2
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-01.16	-00.41

****

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		9.0					1	9.0	3.0
NNE							0	0.0	
NE	9.0						1	9.0	.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	9.0						1	9.0	2.0
SSE		18.1					2	18.1	3.9
S	9.0						1	9.0	.8
SSW	9.0	9.0					2	18.0	2.6
SW							0	0.0	
WSW	18.1						2	18.1	1.4
W							0	0.0	
WNW							0	0.0	
NW	9.0						1	9.0	2.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	63.1	36.1					11		2.2

SURFACE WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	8.3	8.3					2	16.6	2.3
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.2
SSE							0	0.0	
S		25.0	8.3				4	33.3	4.4
SSW	8.3	8.3					2	16.6	3.2
SW		8.3					1	8.3	5.4
WSW		8.3					1	8.3	5.1
W							0	0.0	
WNW							0	0.0	
NW	8.3						1	8.3	1.9
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	58.2	8.3				12		3.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N			9.0				1	9.0	6.7
NNE	9.0		9.0				2	18.0	5.1
NE	9.0						1	9.0	2.6
ENE	18.1						2	18.1	2.3
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			18.1				2	18.1	8.0
S		9.0					1	9.0	3.5
SSW							0	0.0	
SW				9.0			1	9.0	10.0
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	9.0						1	9.0	.5
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.1	9.0	36.1	9.0			11		4.9

100 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	1.8
NE		8.3					1	8.3	3.2
ENE							0	0.0	
E	8.3						1	8.3	1.5
ESE							0	0.0	
SE							0	0.0	
SSE		8.3	8.3				2	16.6	6.0
S	25.0						3	25.0	1.6
SSW		8.3					1	8.3	3.0
SW	8.3		8.3				2	16.6	4.9
WSW							0	0.0	
W			8.3				1	8.3	6.7
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	49.9	24.9	24.9				12		3.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	9.0	9.0	9.0				3	27.0	4.9
NE	9.0	9.0	9.0				3	27.0	5.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			18.1				2	18.1	6.6
S							0	0.0	
SSW			9.0				1	9.0	6.4
SW			9.0				1	9.0	8.2
WSW	9.0						1	9.0	2.3
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	18.0	54.1				11		5.4

200 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	1.6
NE		8.3					1	8.3	3.1
ENE	8.3						1	8.3	1.5
E							0	0.0	
ESE	8.3						1	8.3	1.5
SE							0	0.0	
SSE	8.3	25.0					4	33.3	3.6
S		8.3					1	8.3	4.0
SSW							0	0.0	
SW	8.3		8.3				2	16.6	4.2
WSW							0	0.0	
W			8.3				1	8.3	7.9
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	41.6	16.6				12		3.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N		9.0					1	9.0	4.1
NNE	9.0			9.0			2	18.0	6.2
NE	9.0		9.0				2	18.0	4.9
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	9.0						1	9.0	2.4
S			9.0				1	9.0	6.9
SSW	9.0	9.0	9.0				3	27.0	5.2
SW				9.0			1	9.0	11.5
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	36.0	18.0	27.0	18.0			11		5.7

300 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	8.3						1	8.3	1.2
NE		8.3					1	8.3	3.8
ENE	8.3						1	8.3	.7
E							0	0.0	
ESE	8.3						1	8.3	2.6
SE							0	0.0	
SSE		25.0					3	25.0	5.2
S			8.3				1	8.3	6.6
SSW	8.3						1	8.3	2.6
SW							0	0.0	
WSW	8.3	8.3					2	16.6	4.1
W			8.3				1	8.3	8.1
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	41.5	41.6	16.6				12		4.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			9.0				1	9.0	7.3
NE			9.0				1	9.0	6.3
ENE							0	0.0	
E	9.0						1	9.0	1.5
ESE							0	0.0	
SE							0	0.0	
SSE		18.1					2	18.1	3.6
S							0	0.0	
SSW			9.0				1	9.0	8.1
SW		9.0		9.0			2	18.0	7.7
WSW			9.0				1	9.0	9.5
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW		18.1					2	18.1	3.3
CALM							0	0.0	
COL. TOTALS	9.0	45.2	36.0	9.0			11		5.6

500 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		8.3					1	8.3	3.6
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	8.3						1	8.3	2.2
S		8.3			8.3		2	16.6	10.4
SSW	8.3	16.6					3	24.9	4.2
SW	8.3						1	8.3	2.6
WSW				8.3			1	8.3	11.9
W		8.3					1	8.3	5.4
WNW			8.3				1	8.3	6.5
NW							0	0.0	
NNW	8.3						1	8.3	.7
CALM							0	0.0	
COL. TOTALS	33.2	41.5	8.3	8.3	8.3		12		5.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	9.0						1	9.0	1.8
NNE							0	0.0	
NE							0	0.0	
ENE		9.0					1	9.0	3.1
E							0	0.0	
ESE							0	0.0	
SE			9.0				1	9.0	6.8
SSE							0	0.0	
S	9.0						1	9.0	1.7
SSW							0	0.0	
SW		9.0	18.1				3	27.1	7.1
WSW		9.0					1	9.0	4.0
W				9.0			1	9.0	10.7
WNW	18.1						2	18.1	2.3
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	36.1	27.0	27.1	9.0			11		4.9

750 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	11.1		11.1				2	22.2	4.0
S							0	0.0	
SSW	11.1	22.2					3	33.3	3.0
SW							0	0.0	
WSW				11.1			1	11.1	15.5
W		22.2					2	22.2	3.9
WNW		11.1					1	11.1	5.9
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	55.5	11.1	11.1			9		5.1

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	9.0	9.0					2	18.0	2.4
ENE							0	0.0	
E		9.0					1	9.0	4.4
ESE							0	0.0	
SE							0	0.0	
SSE	9.0						1	9.0	2.7
S							0	0.0	
SSW		9.0					1	9.0	4.5
SW		9.0					1	9.0	5.6
WSW		9.0		9.0	9.0		3	27.0	11.3
W			9.0				1	9.0	7.5
WNW							0	0.0	
NW	9.0						1	9.0	.7
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	45.0	9.0	9.0	9.0		11		5.8

1000 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE			12.5				1	12.5	6.4
S		12.5					1	12.5	5.3
SSW							0	0.0	
SW		25.0					2	25.0	4.5
WSW			12.5				1	12.5	7.4
W		12.5					1	12.5	4.9
WNW			12.5				1	12.5	6.3
NW		12.5					1	12.5	3.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		62.5	37.5				8		5.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	10.0						1	10.0	1.8
NE	10.0						1	10.0	1.5
ENE		10.0					1	10.0	3.7
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		10.0					1	10.0	5.7
S							0	0.0	
SSW		10.0					1	10.0	4.4
SW							0	0.0	
WSW							0	0.0	
W			10.0	10.0	10.0		3	30.0	12.9
WNW		10.0					1	10.0	3.1
NW		10.0					1	10.0	5.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	50.0	10.0	10.0	10.0		10		6.4

1500 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E				12.5			1	12.5	12.0
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW		25.0					2	25.0	3.3
SW							0	0.0	
WSW					12.5		1	12.5	17.7
W		12.5	25.0	12.5			4	50.0	7.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		37.5	25.0	25.0	12.5		8		8.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING MARCH,1979

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		16.6					1	16.6	3.4
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW	16.6						1	16.6	2.9
W	33.3						2	33.3	2.5
WNW							0	0.0	
NW		16.6					1	16.6	5.0
NNW				16.6			1	16.6	14.1
CALM							0	0.0	
COL. TOTALS	49.9	33.2		16.6			6		5.0

2000 METER LEVEL WINDS AFTERNOON MARCH,1979

DIRECTION	WIND SPEEDS METERS/SECOND 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W		33.3	33.3				2	66.6	6.3
WNW							0	0.0	
NW			33.3				1	33.3	6.8
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		33.3	66.6				3		6.4

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF MARCH 1979 MORNING

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100	14.8		3.7	14.8		7.4		3.7		3.7		48.1
101-250	11.1	3.7		7.4	3.7			7.4	7.4			40.7
251-500	7.4											7.4
501-750												
TOTAL	33.3	3.7	3.7	22.2	3.7	7.4		11.1	7.4	3.7		
NO INVERSION												3.0
								TOTAL NO. OF OCCURENCES				26
INVERSION TYPE												
1				3.8	3.8			11.5	3.8			22.9
2			3.8	7.6		3.8						15.2
3	23.0	3.8		11.5		3.8			3.8	3.8		49.7
4	11.5											11.5
5												

MONTH OF MARCH 1979 AFTERNOON

THICKNESS (METERS)	INVERSION BASE HEIGHT (METERS) SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100				13.3	6.6	6.6				6.6		33.1
101-250					6.6			20.0	6.6			33.2
251-500												
501-750												
TOTAL				13.3	13.2	6.6		20.0	6.6	6.6		
NO INVERSION												33.0
								TOTAL NO. OF OCCURENCES				10
INVERSION TYPE												
1					10.0			20.0				30.0
2					10.0	10.0		10.0				30.0
3				20.0					10.0	10.0		40.0
4												
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR MARCH 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	4	0
101- 250	5	1
251- 500	1	1
501- 750	1	4
751-1000	0	1
1001-1500	0	0
>1500	0	3
TOTAL	11	10
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	4.2	4.2
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-01.60	-01.45

****

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		9.0					1	9.0	3.1
ENE							0	0.0	
E							0	0.0	
ESE	9.0						1	9.0	.8
SE	18.1	9.0					3	27.1	2.1
SSE		9.0					1	9.0	3.8
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	9.0						1	9.0	.7
WNW	9.0						1	9.0	.4
NW	18.1						2	18.1	1.2
NNW	9.0						1	9.0	.9
CALM							0	0.0	
COL. TOTALS	72.2	27.0					11		1.6

SURFACE WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N	7.6						1	7.6	2.7
NNE							0	0.0	
NE			7.6				1	7.6	6.5
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	7.6						1	7.6	1.1
SSE		23.0					3	23.0	3.9
S	15.3	15.3					4	30.6	2.6
SSW	7.6						1	7.6	1.3
SW			7.6				1	7.6	6.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	7.6						1	7.6	2.5
CALM							0	0.0	
COL. TOTALS	45.7	38.3	15.2				13		3.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING APRIL.1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	9.0						1	9.0	.5
NNE	9.0	18.1					3	27.1	3.4
NE		9.0					1	9.0	3.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	9.0	9.0		9.0			3	27.0	6.4
S							0	0.0	
SSW	9.0						1	9.0	2.0
SW							0	0.0	
WSW							0	0.0	
W	18.1						2	18.1	1.1
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	54.1	36.1		9.0			11		3.4

100 METER LEVEL WINDS AFTERNOON APRIL.1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			7.6				1	7.6	7.5
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	15.3						2	15.3	1.3
SSE	7.6	23.0					4	30.6	4.1
S							0	0.0	
SSW	7.6	7.6	7.6				3	22.8	3.9
SW							0	0.0	
WSW		7.6					1	7.6	5.0
W							0	0.0	
WNW	7.6						1	7.6	1.5
NW							0	0.0	
NNW	7.6						1	7.6	2.5
CALM							0	0.0	
COL. TOTALS	45.7	38.2	15.2				15		3.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING APRIL.1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		9.0	9.0		9.0		3	27.0	9.0
NE	9.0						1	9.0	2.5
ENE							0	0.0	
E							0	0.0	
ESE	18.1						2	18.1	2.3
SE							0	0.0	
SSE		9.0					1	9.0	4.5
S	9.0	9.0	9.0				3	27.0	4.0
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW	9.0						1	9.0	2.4
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.1	27.0	18.0		9.0		11		5.0

200 METER LEVEL WINDS AFTERNOON APRIL.1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			7.6				1	7.6	7.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	7.6	15.3	7.6	7.6			5	38.1	6.6
S							0	0.0	
SSW			15.3				2	15.3	7.6
SW							0	0.0	
WSW	7.6	7.6					2	15.2	3.3
W							0	0.0	
WNW	7.6						1	7.6	1.1
NW	7.6	7.6					2	15.2	3.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.4	30.5	30.5	7.6			13		5.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW	SUMMARY	
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		9.0					1	9.0	4.2
NE			9.0				1	9.0	6.9
ENE							0	0.0	
E							0	0.0	
ESE	27.2	9.0					4	36.2	2.3
SE			9.0				1	9.0	6.3
SSE							0	0.0	
S	9.0						1	9.0	2.1
SSW		9.0	9.0				2	18.0	6.4
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW		9.0					1	9.0	3.1
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	36.2	36.0	27.0				11		4.0

300 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW	SUMMARY	
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		7.6					1	7.6	4.6
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	7.6	30.7					5	38.3	3.7
S				7.6			1	7.6	13.6
SSW		7.6					1	7.6	3.5
SW	7.6						1	7.6	2.1
WSW	7.6	7.6					2	15.2	3.3
W							0	0.0	
WNW							0	0.0	
NW	7.6						1	7.6	1.1
NNW	7.6						1	7.6	2.4
CALM							0	0.0	
COL. TOTALS	38.0	53.5		7.6			13		4.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW	SUMMARY	
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	10.0						1	10.0	2.0
NNE		10.0					1	10.0	3.0
NE							0	0.0	
ENE							0	0.0	
E	10.0						1	10.0	2.1
ESE							0	0.0	
SE		10.0					1	10.0	5.6
SSE		10.0		10.0			2	20.0	7.8
S			10.0				1	10.0	6.6
SSW							0	0.0	
SW		10.0	10.0				2	20.0	4.9
WSW							0	0.0	
W							0	0.0	
WNW		10.0					1	10.0	4.0
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	50.0	20.0	10.0			10		4.8

500 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW	SUMMARY	
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N			9.0				1	9.0	6.7
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	18.1	9.0					3	27.1	2.7
SE			9.0				1	9.0	6.8
SSE	9.0						1	9.0	1.6
S	9.0						1	9.0	2.4
SSW							0	0.0	
SW	18.1		9.0				3	27.1	3.8
WSW							0	0.0	
W	9.0						1	9.0	1.0
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	63.2	9.0	27.0				11		3.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	10.0						1	10.0	.3
ENE							0	0.0	
E							0	0.0	
ESE	10.0						1	10.0	2.6
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW		20.0	10.0				3	30.0	5.3
SW				10.0			1	10.0	11.0
WSW			10.0				1	10.0	7.4
W	10.0						1	10.0	1.2
WNW							0	0.0	
NW			10.0				1	10.0	6.5
NNW		10.0					1	10.0	4.5
CALM							0	0.0	
COL. TOTALS	30.0	30.0	30.0	10.0			10		4.9

750 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	9.0						1	9.0	.3
ENE							0	0.0	
E			9.0				1	9.0	6.2
ESE	18.1						2	18.1	2.5
SE							0	0.0	
SSE	9.0				9.0		2	18.0	10.7
S							0	0.0	
SSW							0	0.0	
SW		9.0			9.0		2	18.0	10.1
WSW		18.1					2	18.1	4.0
W	9.0						1	9.0	.6
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.1	27.1	9.0		18.0		11		5.6

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	10.0						1	10.0	.9
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE			10.0				1	10.0	7.4
SE							0	0.0	
SSE	10.0						1	10.0	.4
S		10.0					1	10.0	4.6
SSW			20.0				2	20.0	7.5
SW							0	0.0	
WSW			10.0				1	10.0	9.3
W			10.0	10.0			2	20.0	10.4
WNW							0	0.0	
NW			10.0				1	10.0	7.7
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	10.0	60.0	10.0			10		6.6

1000 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		11.1					1	11.1	3.6
ENE							0	0.0	
E							0	0.0	
ESE			11.1				1	11.1	7.6
SE		11.1					1	11.1	5.1
SSE						11.1	1	11.1	26.1
S							0	0.0	
SSW	11.1						1	11.1	2.6
SW				11.1			1	11.1	14.6
WSW							0	0.0	
W		22.2					2	22.2	5.6
WNW	11.1						1	11.1	1.1
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	44.4	11.1	11.1		11.1	9		8.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	11.1						1	11.1	2.2
ENE							0	0.0	
E				11.1			1	11.1	13.0
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW			22.2				2	22.2	7.8
WSW							0	0.0	
W		11.1					1	11.1	5.1
WNW			11.1	22.2			3	33.3	11.2
NW							0	0.0	
NNW		11.1					1	11.1	3.5
CALM							0	0.0	
COL. TOTALS	11.1	22.2	33.3	33.3			9		6.1

1500 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	12.5						1	12.5	2.2
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE			12.5				1	12.5	9.9
SE							0	0.0	
SSE						12.5	1	12.5	26.3
S			12.5				1	12.5	8.7
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	12.5						1	12.5	2.3
WNW	12.5	12.5					2	25.0	3.9
NW			12.5				1	12.5	6.6
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	37.5	12.5	37.5			12.5	8		7.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE				12.5			1	12.5	11.3
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W			12.5				1	12.5	7.5
WNW			25.0	12.5			3	37.5	9.1
NW				12.5			1	12.5	10.1
NNW		12.5	12.5				2	25.0	8.6
CALM							0	0.0	
COL. TOTALS		12.5	50.0	37.5			8		8.2

2000 METER LEVEL WINDS AFTERNOON APRIL,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW			33.3	33.3			2	66.6	10.4
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW			33.3				1	33.3	8.2
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS			66.6	33.3			3		9.7

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF APRIL 1979 MORNING

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	********** INVERSION BASE HEIGHT (METERS) **********											
001-100	4.1		12.5	8.3		4.1		4.1		4.1		37.2
101-250	20.8			12.5		4.1	4.1		4.1			45.6
251-500	8.3		4.1									12.4
501-750												
TOTAL	33.2		16.6	20.8		8.2	4.1	4.1	4.1	4.1		
NO INVERSION												4.0
								TOTAL NO. OF OCCURENCES				23

INVERSION TYPE												
1				8.6		4.3	4.3		4.3			21.5
2	8.6		17.3	4.3		4.3		4.3				38.8
3	17.3			8.6						4.3		30.2
4	8.6											8.6
5												

MONTH OF APRIL 1979 AFTERNOON

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	********** INVERSION BASE HEIGHT (METERS) **********											
001-100				10.0	10.0			20.0				40.0
101-250				10.0					10.0			20.0
251-500												
501-750												
TOTAL				20.0	10.0			20.0	10.0			
NO INVERSION												40.0
								TOTAL NO. OF OCCURENCES				6

INVERSION TYPE												
1								16.6				16.6
2				10.6	10.6			16.6	16.6			66.4
3												
4				16.6								16.6
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR APRIL 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	5	0
101- 250	1	0
251- 500	3	1
501- 750	0	0
751-1000	1	1
1001-1500	1	2
>1500	1	4
TOTAL	12	8
AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.3	5.2
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.74	-01.42

****

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		7.6					1	7.6	3.6
NNE	23.0	7.6					4	30.6	2.0
NE							0	0.0	
ENE							0	0.0	
E	7.6						1	7.6	.4
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW	7.6						1	7.6	.4
SW			7.6				1	7.6	6.9
WSW							0	0.0	
W	15.3						2	15.3	1.1
WNW	7.6						1	7.6	.3
NW							0	0.0	
NNW	15.3						2	15.3	1.0
CALM							0	0.0	
COL. TOTALS	76.4	15.2	7.6				13		1.8

SURFACE WINDS AFTERNOON MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N		10.0					1	10.0	3.3
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E		10.0					1	10.0	4.0
ESE							0	0.0	
SE	10.0	10.0					2	20.0	2.9
SSE							0	0.0	
S	10.0	10.0					2	20.0	3.3
SSW				10.0			1	10.0	10.3
SW			10.0				1	10.0	6.7
WSW			10.0				1	10.0	6.0
W	10.0						1	10.0	.8
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.0	40.0	20.0	10.0			10		4.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	7.6						1	7.6	2.9
NNE	15.3	23.0					5	38.3	3.5
NE			7.6				1	7.6	7.8
ENE							0	0.0	
E							0	0.0	
ESE	7.6						1	7.6	.9
SE							0	0.0	
SSE	7.6						1	7.6	2.6
S		7.6					1	7.6	3.6
SSW	7.6						1	7.6	2.9
SW				7.6			1	7.6	11.5
WSW	7.6						1	7.6	.6
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	53.3	30.6	7.6	7.6			13		3.8

100 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	10.0						1	10.0	.9
ENE							0	0.0	
E							0	0.0	
ESE	10.0	10.0					2	20.0	2.6
SE	10.0			10.0			2	20.0	5.8
SSE							0	0.0	
S		10.0					1	10.0	3.8
SSW	10.0						1	10.0	1.7
SW		10.0		10.0			2	20.0	7.9
WSW							0	0.0	
W		10.0					1	10.0	5.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	40.0	40.0		20.0			10		4.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING MAY,1975

DIRECTION	********* WIND SPEEDS METERS/SECOND *********								
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		7.6	7.6				2	15.2	5.2
NE		7.6	7.6				2	15.2	6.5
ENE	15.3						2	15.3	1.9
E	7.6						1	7.6	.5
ESE							0	0.0	
SE							0	0.0	
SSE			7.6				1	7.6	7.8
S	7.6	7.6					2	15.2	3.0
SSW	7.6	7.6					2	15.2	3.7
SW				7.6			1	7.6	12.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	38.1	30.4	22.8	7.6			13		4.8

200 METER LEVEL WINDS AFTERNOON MAY,1975

DIRECTION	********* WIND SPEEDS METERS/SECOND *********								
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E	10.0						1	10.0	2.9
ESE	10.0	10.0					2	20.0	3.1
SE							0	0.0	
SSE	20.0						2	20.0	1.6
S	10.0						1	10.0	1.5
SSW							0	0.0	
SW			10.0				1	10.0	8.7
WSW				10.0			1	10.0	10.2
W			10.0				1	10.0	8.6
WNW							0	0.0	
NW	10.0						1	10.0	2.5
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	60.0	10.0	20.0	10.0			10		4.3

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING MAY,1975

DIRECTION	********* WIND SPEEDS METERS/SECOND *********								
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		7.6	7.6				2	15.2	6.3
NE	15.3						2	15.3	1.7
ENE	7.6						1	7.6	2.1
E	7.6						1	7.6	1.1
ESE							0	0.0	
SE	7.6						1	7.6	1.9
SSE	7.6	7.6					2	15.2	3.0
S		15.3					2	15.3	4.5
SSW							0	0.0	
SW		7.6		7.6			2	15.2	9.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.7	38.1	7.6	7.6			13		4.3

300 METER LEVEL WINDS AFTERNOON MAY,1975

DIRECTION	********* WIND SPEEDS METERS/SECOND *********								
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW TOTAL COUNT	SUMMARY TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	10.0	10.0					2	20.0	2.7
SE	10.0						1	10.0	2.1
SSE	10.0	10.0					2	20.0	4.0
S	10.0						1	10.0	2.2
SSW							0	0.0	
SW				10.0			1	10.0	11.2
WSW			10.0				1	10.0	6.8
W			10.0				1	10.0	6.9
WNW	10.0						1	10.0	2.6
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	50.0	20.0	20.0	10.0			10		4.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			7.6				1	7.6	9.8
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	7.6						1	7.6	2.2
SE	7.6						1	7.6	2.6
SSE		15.3					2	15.3	4.8
S		15.3					2	15.3	4.5
SSW	7.6	7.6					2	15.2	3.5
SW		7.6	7.6	7.6			3	22.8	7.8
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW	7.6						1	7.6	.5
CALM							0	0.0	
COL. TOTALS	30.4	45.8	15.2	7.6			13		4.9

500 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE	10.0						1	10.0	2.1
SE	10.0						1	10.0	2.9
SSE		10.0		10.0			2	20.0	8.3
S		20.0					2	20.0	4.4
SSW							0	0.0	
SW	10.0		10.0				2	20.0	3.5
WSW				10.0			1	10.0	13.7
W			10.0				1	10.0	9.3
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.0	30.0	20.0	20.0			10		6.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E	8.3						1	8.3	.6
ESE							0	0.0	
SE		25.0					3	25.0	4.7
SSE		8.3					1	8.3	4.3
S							0	0.0	
SSW		8.3					1	8.3	3.1
SW	25.0		8.3				4	33.3	3.5
WSW			8.3	8.3			2	16.6	9.5
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.3	41.6	16.6	8.3			12		4.6

750 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	10.0						1	10.0	2.3
E							0	0.0	
ESE							0	0.0	
SE	10.0						1	10.0	2.5
SSE	10.0	10.0					2	20.0	2.7
S		20.0					2	20.0	4.2
SSW							0	0.0	
SW		10.0					1	10.0	5.3
WSW			10.0	10.0			2	20.0	10.1
W				10.0			1	10.0	14.3
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.0	40.0	10.0	20.0			10		5.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	9.0						1	9.0	2.9
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		9.0					1	9.0	4.0
SSE	9.0						1	9.0	1.3
S							0	0.0	
SSW		9.0					1	9.0	3.3
SW	9.0		9.0				2	18.0	4.9
WSW							0	0.0	
W	9.0	9.0	9.0				3	27.0	4.7
WNW	9.0						1	9.0	.5
NW							0	0.0	
NNW	9.0						1	9.0	1.0
CALM							0	0.0	
COL. TOTALS	54.0	27.0	18.0				11		3.3

1000 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE	10.0						1	10.0	2.1
E							0	0.0	
ESE							0	0.0	
SE	10.0						1	10.0	2.5
SSE			10.0				1	10.0	7.9
S	10.0						1	10.0	.9
SSW		10.0	10.0				2	20.0	5.2
SW		10.0					1	10.0	4.4
WSW			20.0	10.0			3	30.0	10.0
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.0	20.0	40.0	10.0			10		5.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW	9.0						1	9.0	2.7
SW							0	0.0	
WSW	9.0	9.0		18.1			4	36.1	7.9
W			9.0	9.0			2	18.0	9.9
WNW	9.0		9.0				2	18.0	4.3
NW		18.1					2	18.1	3.5
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	27.0	27.1	18.0	27.1			11		6.3

1500 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE		11.1					1	11.1	3.6
SE							0	0.0	
SSE			11.1				1	11.1	8.7
S	11.1			11.1			2	22.2	9.3
SSW	11.1						1	11.1	.9
SW				11.1			1	11.1	10.7
WSW		11.1	11.1				2	22.2	6.2
W					11.1		1	11.1	17.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	22.2	22.2	22.2	22.2	11.1		9		8.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE				10.0			1	10.0	14.1
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW			10.0				1	10.0	6.7
WSW			10.0				1	10.0	8.2
W	10.0		10.0				2	20.0	5.8
WNW		10.0	10.0	10.0			3	30.0	8.3
NW			10.0	10.0			2	20.0	10.8
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	10.0	10.0	50.0	30.0			10		8.7

2000 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S		22.2	11.1				3	33.3	5.2
SSW							0	0.0	
SW	11.1		11.1			11.1	3	33.3	11.7
WSW				11.1			1	11.1	13.4
W					11.1		1	11.1	16.3
WNW				11.1			1	11.1	11.2
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	22.2	22.2	22.2	11.1	11.1	9		10.2

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2500 METER LEVEL WINDS MORNING MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS							0		

2500 METER LEVEL WINDS AFTERNOON MAY,1979

DIRECTION	********** WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S			16.6	16.6			2	33.2	10.4
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	16.6			33.3			3	49.9	9.5
WNW					16.6		1	16.6	21.7
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	16.6		16.6	49.9	16.6		6		11.8

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF MAY 1979 MORNING

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	INVERSION BASE HEIGHT (METERS)											
001-100	4.0	12.0	4.0		12.0	8.0	8.0					48.0
101-250	20.0			12.0	4.0			4.0				40.0
251-500	8.0											8.0
501-750												
TOTAL	32.0	12.0	4.0	12.0	16.0	8.0	8.0	4.0				
NO INVERSION												4.0
								TOTAL NO. OF OCCURENCES				24

INVERSION TYPE											
1		4.1			4.1		8.3	4.1			20.6
2		4.1	4.1	8.3	4.1	4.1					24.7
3	25.0*			4.1	8.3	4.1					41.5
4	4.1	4.1									8.2
5	4.1										4.1

MONTH OF MAY 1979 AFTERNOON

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
	INVERSION BASE HEIGHT (METERS)											
001-100												
101-250							10.0					10.0
251-500												
501-750												
TOTAL							10.0					
NO INVERSION												90.0
								TOTAL NO. OF OCCURENCES				1

INVERSION TYPE											
1							100.0					100.0
2												
3												
4												
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR MAY 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	7	0
101- 250	2	0
251- 500	1	0
501- 750	2	0
751-1000	0	2
1001-1500	0	3
>1500	1	5
TOTAL	13	10

AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	3.0	6.1
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-01.02	-01.14

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

SURFACE WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE	7.6						1	7.6	1.8
ENE	7.6						1	7.6	1.1
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	7.6						1	7.6	.8
S	15.3						2	15.3	2.6
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W	7.6						1	7.6	1.9
WNW	23.0						3	23.0	.7
NW	15.3						2	15.3	1.4
NNW	7.6						1	7.6	.4
CALM							1	7.0	
COL. TOTALS	61.6						13		1.2

SURFACE WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			8.3				1	8.3	7.1
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE		8.3					1	8.3	3.1
SE		8.3					1	8.3	4.2
SSE	8.3	8.3	8.3				3	24.9	4.2
S	8.3	8.3					2	16.6	2.4
SSW							0	0.0	
SW		8.3	8.3				2	16.6	5.5
WSW							0	0.0	
W			8.3				1	8.3	6.3
WNW							0	0.0	
NW							0	0.0	
NNW		8.3					1	8.3	3.6
CALM							0	0.0	
COL. TOTALS	16.6	49.8	33.2				12		4.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

100 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N	7.6						1	7.6	2.0
NNE	15.3	7.6					3	22.9	2.4
NE	15.3	7.6					3	22.9	2.6
ENE	7.6						1	7.6	1.7
E	7.6						1	7.6	2.0
ESE	7.6						1	7.6	1.0
SE							0	0.0	
SSE		7.6					1	7.6	4.4
S	7.6						1	7.6	1.9
SSW							0	0.0	
SW			7.6				1	7.6	6.6
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	61.6	22.8	7.6				13		2.7

100 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			8.3				1	8.3	8.5
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.3
SSE	8.3		16.6				3	24.9	4.6
S	8.3	16.6					3	24.9	3.8
SSW							0	0.0	
SW							0	0.0	
WSW		8.3	8.3				2	16.6	5.4
W			8.3				1	8.3	8.1
WNW							0	0.0	
NW	8.3						1	8.3	2.6
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	33.2	24.9	41.5				12		4.8

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

200 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		15.3					2	15.3	4.1
NE	7.6	7.6		7.6			3	22.8	5.9
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE		7.6	7.6				2	15.2	4.8
S	7.6						1	7.6	2.1
SSW	23.0						3	23.0	1.1
SW	7.6			7.6			2	15.2	7.1
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	45.8	30.5	7.6	15.2			13		4.2

200 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE				8.3			1	8.3	13.8
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	8.3						1	8.3	2.9
SSE		8.3	8.3				2	16.6	7.2
S	8.3	16.6	8.3				4	33.2	4.3
SSW							0	0.0	
SW							0	0.0	
WSW					8.3		1	8.3	16.7
W	8.3		16.6				3	24.9	5.9
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	24.9	24.9	33.2	8.3	8.3		12		6.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

300 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE	15.3						2	15.3	2.4
NE		7.6					1	7.6	3.8
ENE		7.6					1	7.6	5.8
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE	7.6	15.3	15.3				5	38.2	5.3
S							0	0.0	
SSW		7.6					1	7.6	3.5
SW	7.6		7.6				2	15.2	5.8
WSW	7.6						1	7.6	.4
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	38.1	38.1	22.9				13		4.3

300 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND **********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE		8.3					1	8.3	5.4
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		8.3					1	8.3	4.0
SSE		8.3	8.3	8.3			3	24.9	7.0
S	8.3	8.3	8.3				3	24.9	4.2
SSW							0	0.0	
SW							0	0.0	
WSW			8.3				1	8.3	9.2
W		8.3	16.6				3	24.9	5.5
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	8.3	41.5	41.5	8.3			12		5.7

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

500 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						RCW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE		7.6					1	7.6	4.7
SE		7.6	7.6				2	15.2	6.2
SSE	7.6			7.6			2	15.2	7.8
S		15.3					2	15.3	4.1
SSW	15.3	7.6					3	22.9	2.1
SW				7.6			1	7.6	12.3
WSW	7.6						1	7.6	2.8
W							0	0.0	
WNW	7.6						1	7.6	1.4
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	30.1	38.1	7.6	15.2			13		4.9

500 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						RCW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			8.3				1	8.3	8.6
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			8.3				1	8.3	6.5
SSE	8.3	16.6	8.3				4	33.2	4.3
S		16.6					2	16.6	4.0
SSW							0	0.0	
SW							0	0.0	
WSW		16.6					2	16.6	5.2
W		8.3	8.3				2	16.6	6.9
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	8.3	38.1	33.2				12		5.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

750 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						RCW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		7.6					1	7.6	5.3
E							0	0.0	
ESE							0	0.0	
SE		7.6					1	7.6	3.0
SSE	15.3	7.6					3	22.9	2.1
S		23.0	7.6				4	30.6	4.5
SSW			7.6				1	7.6	8.4
SW		7.6					1	7.6	3.9
WSW					7.6		1	7.6	20.4
W		7.6					1	7.6	5.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	15.3	61.0	15.2		7.6		13		5.4

750 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						RCW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE		9.0					1	9.0	4.6
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	9.0	9.0					2	18.0	2.3
SSE		9.0	9.0				2	18.0	7.6
S		18.1					2	18.1	3.9
SSW		9.0					1	9.0	3.4
SW							0	0.0	
WSW				18.1			2	18.1	12.3
W		9.0					1	9.0	5.4
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	9.0	63.1	9.0	18.1			11		5.9

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

1000 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			7.6				1	7.6	7.0
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE		7.6					1	7.6	5.9
SSE							0	0.0	
S	7.6	15.3					3	22.9	3.9
SSW							0	0.0	
SW			15.3				2	15.3	8.7
WSW	7.6	7.6	7.6	7.6			4	30.4	6.3
W		7.6	7.6				2	15.2	5.8
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	15.2	38.1	38.1	7.6			13		6.1

1000 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE			9.0				1	9.0	7.1
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE	9.0						1	9.0	2.7
SSE							0	0.0	
S		9.0					1	9.0	3.2
SSW	9.0						1	9.0	2.2
SW		18.1		9.0			3	27.1	6.6
WSW	18.1	9.0		9.0			4	36.1	6.3
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	36.1	36.1	9.0	18.0			11		5.4

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CC - AIRPORT - FLATHEAD STUDY MET

1500 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			10.0				1	10.0	9.3
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE			10.0				1	10.0	7.8
SSE							0	0.0	
S	10.0						1	10.0	1.3
SSW							0	0.0	
SW	10.0		20.0				3	30.0	6.7
WSW					10.0		1	10.0	21.2
W		10.0					1	10.0	5.2
WNW			10.0				1	10.0	6.5
NW			10.0				1	10.0	8.0
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	20.0	10.0	60.0		10.0		10		7.9

1500 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND *********						ROW SUMMARY		
	00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		10.0					1	10.0	3.6
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S	10.0						1	10.0	2.7
SSW			10.0				1	10.0	6.2
SW					10.0		1	10.0	20.3
WSW		10.0			10.0		2	20.0	11.8
W		10.0	10.0				2	20.0	5.7
WNW			10.0				1	10.0	6.4
NW							0	0.0	
NNW	10.0						1	10.0	.9
CALM							0	0.0	
COL. TOTALS	20.0	30.0	30.0		20.0		10		7.5

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2000 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE			16.6				1	16.6	7.2
NE							0	0.0	
ENE							0	0.0	
E		16.6					1	16.6	5.0
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW						16.6	1	16.6	32.7
WSW	16.6						1	16.6	2.6
W							0	0.0	
WNW			33.3				2	33.3	7.0
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	16.6	16.6	49.9			16.6	6		10.2

2000 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE		11.1					1	11.1	4.0
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW						11.1	1	11.1	42.8
WSW		11.1	44.4				5	55.5	7.8
W		11.1					1	11.1	3.7
WNW							0	0.0	
NW	11.1						1	11.1	.7
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS	11.1	33.3	44.4			11.1	9		10.0

FREQUENCY SUMMARY OF UPPER LEVEL WINDS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

2500 METER LEVEL WINDS MORNING JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E							0	0.0	
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW							0	0.0	
WSW							0	0.0	
W							0	0.0	
WNW							0	0.0	
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS							0		

2500 METER LEVEL WINDS AFTERNOON JUNE,1979

DIRECTION	********* WIND SPEEDS METERS/SECOND ********* 00.1 TO 02.9	03.0 TO 05.9	06.0 TO 09.9	10.0 TO 15.9	16.0 TO 25.0	GREATER THAN 25.0	ROW SUMMARY TOTAL COUNT	TOTAL PERCENT	AVERAGE SPEED
N							0	0.0	
NNE							0	0.0	
NE							0	0.0	
ENE							0	0.0	
E		14.2					1	14.2	3.0
ESE							0	0.0	
SE							0	0.0	
SSE							0	0.0	
S							0	0.0	
SSW							0	0.0	
SW				28.5			2	28.5	11.6
WSW							0	0.0	
W				28.5			2	28.5	11.3
WNW			14.2	14.2			2	28.4	8.5
NW							0	0.0	
NNW							0	0.0	
CALM							0	0.0	
COL. TOTALS		14.2	14.2	71.2			7		9.4

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MONTH OF JUNE 1979 MORNING

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100				4.3	8.6	4.3	4.3	4.3				25.8
101-250	26.0	4.3		17.3		4.3	4.3					56.2
251-500	17.3											17.3
501-750												
TOTAL	43.3	4.3		21.6	8.6	8.6	8.6	4.3				
NO INVERSION												0.0
								TOTAL NO. OF OCCURENCES				23

INVERSION TYPE												
1				4.3		8.6	8.6					21.5
2	8.6			8.6	4.3			4.3				25.8
3	21.7	4.3		8.6	4.3							38.9
4	13.0											13.0
5												

MONTH OF JUNE 1979 AFTERNOON

THICKNESS (METERS)	SFC	001 TO 100	101 TO 250	251 TO 500	501 TO 750	751 TO 1000	1001 TO 1500	1501 TO 2000	2001 TO 2500	2501 TO 3000	> THAN 3000	TOTAL
001-100											10.0	10.0
101-250										10.0		10.0
251-500												
501-750												
TOTAL										10.0	10.0	
NO INVERSION												80.0
								TOTAL NO. OF OCCURENCES				2

INVERSION TYPE												
1												
2												
3											50.0	50.0
4										50.0		50.0
5												

FREQUENCY SUMMARY OF MIXING HEIGHTS

LOCATION: FLATHEAD CO - AIRPORT - FLATHEAD STUDY MET

MIXING HEIGHTS -FREQUENCY OF OCCURENCE FOR JUNE 1979

MIXING HEIGHT (METERS)	MORNING OCCURENCES	AFTERNOON OCCURENCES
0- 100	6	0
101- 250	5	0
251- 500	1	0
501- 750	0	1
751-1000	0	1
1001-1500	1	1
>1500	0	7
TOTAL	13	10

AVERAGE WIND SPEED THROUGH MIXED LAYER (M/SEC)	2.2	6.4
AVERAGE LAPSE RATE BELOW FIRST INVER. (DEG C /100M)	-00.47	-00.89

KALISPELL - GLACIER INTERNATION AIRPORT
1978-1979

MORNING MIXING HEIGHTS - NUMBER OF OCCURRENCES

HEIGHT(m)	1978 JUL	AUG	SEP	OCT	NOV	DEC	1979 JAN	FEB	MAR	APR	MAY	JUN	SUM	AUT	WIN	SPG	ANNUAL
0-100	4	6	4	9	5	4	2	0	4	5	7	6	16	18	6	16	56
101-250	3	1	1	2	1	0	2	1	5	1	2	5	9	4	3	8	24
251-500	3	4	1	1	1	0	3	6	1	3	1	1	8	3	9	5	25
501-750	1	0	0	1	1	0	0	0	1	0	2	0	1	2	0	3	6
751-1000	0	0	1	0	1	1	0	0	0	1	0	0	0	2	1	1	4
1001-1500	0	1	0	0	1	1	0	0	0	1	0	1	2	1	1	1	5
>1500	1	0	2	0	2	2	0	2	0	1	1	0	1	4	4	2	11
Total	12	12	9	13	12	8	7	9	11	12	13	13	37	34	24	36	131

MIXING HEIGHTS - PERCENT OCCURRENCE

HEIGHT(m)	1978 JUL	AUG	SEP	OCT	NOV	DEC	1979 JAN	FEB	MAR	APR	MAY	JUN	SUM	AUT	WIN	SPG	ANNUAL
0-100	33.0	50.0	44.4	69.2	41.7	50.0	28.6	0.0	36.4	41.7	53.8	46.2	43.2	52.9	25.0	44.4	42.7
101-250	25.0	8.3	11.1	15.4	8.3	0.0	28.6	11.1	45.5	8.3	15.4	38.5	24.3	11.8	12.5	22.2	18.3
251-500	25.0	33.3	11.1	7.7	8.3	0.0	42.9	66.7	9.1	25.0	7.7	7.7	21.6	8.8	37.5	13.9	19.1
501-750	8.3	0.0	0.0	7.7	8.3	0.0	0.0	0.0	9.1	0.0	15.4	0.0	2.7	5.9	0.0	8.3	4.6
651-1000	0.0	0.0	11.1	0.0	8.3	12.5	0.0	0.0	0.0	8.3	0.0	0.0	0.0	5.9	4.2	2.8	3.1
1001-1500	0.0	8.3	0.0	0.0	8.3	12.5	0.0	0.0	0.0	8.3	0.0	7.7	5.4	2.9	4.2	2.8	3.8
>1500	8.3	0.0	22.2	0.0	16.7	25.0	0.0	22.2	0.0	8.3	7.7	0.0	2.7	11.8	16.7	5.6	8.4

AVERAGE WIND SPEED THROUGH MIXED LAYER (m/sec)

	3.8	3.8	6.2	3.3	4.6	4.4	3.1	4.9	4.2	3.3	3.0	2.2	3.2	4.5	4.2	3.5	3.8

AVERAGE LAPSE RATE BELOW FIRST INVERSION (DEG C/100M)

	-1.62	-0.66	-0.80	-1.12	-0.71	-0.95	-0.85	-1.16	-1.60	-0.74	-1.02	-0.47	-0.90	-0.89	-1.00	-1.10	-0.97

TABLE

KALISPELL - GLACIER INTERNATION AIRPORT
1978-1979

AFTERNOON MIXING HEIGHTS - NUMBER OF OCCURRENCES

HEIGHT(m)	1978 JUL	AUG	SEP	OCT	NOV	DEC	1979 JAN	FEB	MAR	APR	MAY	JUN	SUM	AUT	WIN	SPG	ANNUAL
0-100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101-250	0	0	0	0	0	5	3	4	1	0	0	0	0	0	12	1	13
251-500	1	0	0	0	2	0	3	2	1	1	0	0	1	2	5	2	10
501-750	0	2	0	3	0	0	0	0	4	0	0	1	3	3	0	4	10
751-1000	4	0	1	1	1	0	0	0	1	1	2	1	5	3	0	4	12
1001-1500	2	1	1	3	1	0	0	0	0	2	3	1	4	5	0	5	14
1500	3	8	5	1	4	2	0	1	3	4	5	7	18	10	3	12	43
Total	10	11	7	8	8	7	6	7	10	8	10	10	31	23	20	28	102

MIXING HEIGHTS - PERCENT OCCURRENCE

HEIGHT(m)	1978 JUL	AUG	SEP	OCT	NOV	DEC	1979 JAN	FEB	MAR	APR	MAY	JUN	SUM	AUT	WIN	SPG	ANNUAL
0-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
101-250	0.0	0.0	0.0	0.0	0.0	71.4	50.0	57.1	10.0	0.0	0.0	0.0	0.0	0.0	60.0	3.6	12.7
251-500	10.0	0.0	0.0	0.0	26.0	0.0	50.0	28.6	10.0	12.5	0.0	0.0	3.2	8.7	25.0	7.1	9.8
501-750	0.0	18.2	0.0	37.5	0.0	0.0	0.0	0.0	40.0	0.0	0.0	10.0	9.7	13.0	0.0	14.3	9.8
651-1000	40.0	0.0	14.3	12.5	12.5	0.0	0.0	0.0	10.0	12.5	20.0	10.0	16.1	13.0	0.0	14.3	11.8
1001-1500	20.0	9.1	14.3	37.5	12.5	0.0	0.0	0.0	0.0	25.0	30.0	10.0	12.9	21.7	0.0	17.9	13.7
1500	30.0	72.7	71.4	12.5	50.0	28.6	0.0	14.3	30.0	50.0	50.0	70.0	58.1	43.5	15.0	42.9	42.2

AVERAGE WIND SPEED THROUGH MIXED LAYER (m/sec)

	4.7	4.7	8.0	4.9	4.8	4.7	2.0	5.2	4.2	5.2	6.1	6.4	5.2	5.8	4.1	5.2	5.1

AVERAGE LAPSE RATE BELOW FIRST INVERSION (DEG C/100M)

	-2.59	-1.18	-1.56	-1.23	-1.35	-1.03	-0.74	-0.41	-1.45	-1.42	-1.14	-0.89	-1.54	-1.37	-0.73	-1.33	-1.29

SITE - Kalispell Glacier International Airport

AVERAGE LAPSE RATE IN FIRST INVERSION (C/100m) - MORNING

JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	SUM	AUT	WIN	SPG	ANNUAL
	3.8	3.8	6.2	3.3	4.6	4.4	3.1	4.9	4.2	3.3		3.8	4.5	4.2	3.7	4.1

AVERAGE LAPSE RATE BELOW FIRST INVERSION (C) - MORNING

	-1.62	-.66	-.80	-1.12	-.71	-.95	-.85	-1.16	-1.60	-.74		-1.14	-.89	-1.00	-1.15	-1.00

PERCENT FREQUENCY OF SURFACE BASED FIRST INVERSIONS - MORNING

AVERAGE LAPSE RATE IN FIRST INVERSION (C/100m) - AFTERNOON

JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	SUM	AUT	WIN	SPG	ANNUAL
	4.7	4.7	8.0	4.9	4.8	4.7	2.0	5.2	4.2	5.2		4.7	5.8	4.1		4.8

AVERAGE LAPSE RATE BELOW FIRST INVERSION (C) - AFTERNOON

	-2.59	-1.18	-1.56	-1.23	-1.35	-1.03	-.74	-.41	-1.45	-1.42		-1.85	-1.37	-.74	-1.44	-1.36

PERCENT FREQUENCY OF SURFACED BASED FIRST INVERSIONS - AFTERNOON

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: Kalispell
MONTH OR SEASON: Summer 1978 MORNING

INVERSION BASE HEIGHT

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Tot
1-100	7.7	3.1	3.1	10.8	12.3	3.1	7.7	1.5	1.5			50.
101-250	7.7	1.5	3.1	6.2	6.2	1.5	3.1	3.1	1.5			33.
251-500	9.7	1.5										10.
501-750			1.5									1.
total	24.6	6.2	7.7	16.9	18.5	4.6	10.8	4.6	3.1			96.

No Inversion 3.1

Total No. of Occurrences

Inversion Type												
1	3.2		1.6	1.6	6.3	1.6	7.9	1.6				23.
2	3.2		3.2	9.5	3.2	3.2	3.2					25.
3	11.1	4.8	3.2	6.3	7.9			3.2	1.6			38.
4	7.9	1.6			1.6				1.6			12.
5												

MONTH OR SEASON: AFTERNOON

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Tota
1-100		3.3	3.3	6.7		3.3	6.7		3.3			26.
101-250					3.3			6.7	6.7			16.
251-500							3.3					3.
501-750												
Total		3.3	3.3	6.7	3.3	3.3	10.0	6.7	10.0			46.

No Inversion 53.3

Total No. of Occurrences

Inversion Type												
1							7.1	7.1	7.1			21.
2			7.1				14.3	7.1	7.1			35.
3		7.1		14.3	7.1	7.1						35.
4									7.1			7.
5												

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: Kalsipell
MONTH OR SEASON: Autumn 1978 MORNING

INVERSION BASE HEIGHT

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Tota
1-100	5.9	3.9	4.9	6.9	6.9	3.9	2.0	2.0	3.9			40.2
101-250	8.8	2.9	1.0	5.9	3.9	2.9	2.9	3.9	7.8			40.2
251-500	5.9		1.0	1.0	2.9	1.0		2.9				14.7
501-750	1.0						1.0		1.0			2.9
total	21.6	6.9	6.9	13.7	13.7	7.8	5.9	8.8	12.7			98.0

No Inversion 2.0

Total No. of Occurrences

Inversion Type												
1	3.0		1.0	3.0	6.0	2.0	3.0	3.0	7.0			28.0
2	2.0	2.0	4.0	7.0	3.0	3.0	1.0	4.0	3.0			29.0
3	6.0	2.0	1.0	3.0	4.0	3.0	2.0	2.0	3.0			26.0
4	11.0	3.0	1.0	1.0	1.0							17.0
5												

MONTH OR SEASON: AFTERNOON

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Total
1-100			2.2	4.4	8.9	8.9	4.4		8.9			37.8
01-250		2.2		6.7		6.7	6.7	4.4	4.4			31.1
51-500								6.7	6.7			13.3
01-750												
Total		2.2	2.2	11.1	8.9	15.6	11.1	11.1	20.0			82.2

o Inversion 17.8

Total No. of Occurrences

nversion Type												
1		2.7			2.7	8.1	5.4	5.4	13.5			37.8
2			2.7	5.4	5.4	5.4	8.1	8.1	5.4			40.5
3				8.1	2.7	2.7			5.4			18.9
4						2.7						2.7
5												

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: Kalispell
MONTH OR SEASON: Winter 1978-79 MORNING

INVERSION BASE HEIGHT

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Tota
1-100	12.5	4.7	9.4	10.9	3.1	4.7	3.1	3.1	1.6			53.1
101-250	6.3		3.1	6.3	6.3	3.1	3.1	3.1	3.1			34.4
251-500	1.6	3.1		1.6			3.1	1.6				10.9
501-750												
total	20.3	7.8	12.5	18.8	9.4	7.8	9.4	7.8	4.7			98.4

No Inversion 1.6

Total No. of Occurrences

Inversion Type												
1			1.6	4.8		3.2	4.8	1.6	1.6			17.5
2	4.8	3.2	4.8	7.9	3.2	3.2	3.2	1.6	1.6			33.3
3	9.5	4.8	4.8	3.2	3.2	1.6	1.6	4.8				33.3
4	4.8		1.6	3.2	3.2							12.7
5	1.6								1.6			3.2

MONTH OR SEASON: AFTERNOON

THICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000	Tota
1-100	1.9	7.5	3.8	3.8	3.8		5.7	3.8	3.8			34.0
101-250	13.2		5.7	13.2		1.9	3.8	7.5				45.3
251-500		3.8				1.9	1.9	1.9				9.4
501-750					1.9							1.9
Total	15.1	11.3	9.4	17.0	5.7	3.8	11.3	13.2	3.8			90.6

No Inversion 9.4

Total No. of Occurrences

Inversion Type												
1	8.3		2.1	4.2		2.1	4.2		2.1			22.9
2	4.2	2.1	4.2	2.1			4.2	6.3	2.1			25.0
3	4.2	4.2	4.2	10.4		8.3	2.1	8.3				41.7
4		6.3		2.1				2.1				10.4
5												

TABLE

FREQUENCY SUMMARY OF INVERSIONS (PERCENTAGES)

LOCATION: Kalispell
MONTH OR SEASON: Spring 1979 MORNING

INVERSION BASE HEIGHT

ICKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501-3000	3000	Total
1-100	7.9	3.9	6.6	7.9	3.9	6.6	2.6	2.6		2.6		44.7
1-250	17.1	1.3		10.5	2.6	1.3	1.3	3.9	3.9			42.1
1-500	7.9		1.3									9.2
1-750												
otal	32.9	5.3	7.9	18.4	6.6	7.9	3.9	6.6	3.9	2.6		

Inversion 3.9

Total No. of Occurences 73

ersion ype												
1		1.4		4.1	2.7	1.4	4.1	5.5	2.7			21.9
2	2.7	1.4	8.2	6.8	1.4	4.1		1.4				26.0
3	21.9	1.4		8.2	2.7	2.7			1.4	2.7		41.1
4	8.2	1.4										9.6
5	1.4											1.4

MONTH OR SEASON Spring 1979 AFTERNOON

CKNESS	SFC	1-100	101-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-2500	2501 3000	3000	Total
-100				8.6	5.7	2.9		5.7		2.9		25.7
-250				2.9	2.9		2.9	8.6	5.7			22.9
-500												
-750												
al				11.4	8.6	2.9	2.9	14.3	5.7	2.9		

Inversion 51.4

Total No. Of Occurences 17

ersion ype												
1					5.9		5.9	17.6				29.4
2			5.9	11.8	5.9		11.8	5.9				41.2
3			11.8					5.9	5.9			23.5
4			5.9									5.9
5												

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF JULY 1978

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	N	N	N	0	2	4
4	0	2	4	4	5	4	3	4	4	0	2	4
5	0	2	3	0	2	3	N	N	N	0	1	4
6	0	2	4	2	3	4	N	N	N	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	N	N	N	0	1	4
11	0	3	4	1	2	4	4	5	4	0	2	4
12	0	2	4	2	3	4	N	N	N	0	2	4
13	0	3	4	2	3	4	N	N	N	0	1	4
14	0	2	4	3	4	4	N	N	N	0	1	4
15	0	4	4	3	4	4	N	N	N	0	1	3
16	0	1	4	N	N	N	N	N	N	0	1	3
17	0	1	3	0	2	3	N	N	N	0	2	4
18	0	2	4	0	1	4	N	N	N	0	1	3
19	0	4	3	3	4	4	N	N	N	0	1	4
20	0	3	3	N	N	N	N	N	N	0	2	4
21	0	3	3	3	4	4	N	N	N	0	1	3
22	0	4	4	3	4	4	N	N	N	0	2	4
23	0	4	4	3	4	4	N	N	N	0	1	4
24	0	2	4	2	3	4	N	N	N	0	1	4
25	0	3	4	3	4	4	N	N	N	0	1	4
26	0	3	4	3	4	4	N	N	N	0	1	4
27	N	N	N	N	N	N	N	N	N	0	1	4
28	0	2	4	3	4	4	N	N	N	0	1	4
29	0	2	4	2	3	4	N	N	N	0	1	4
30	0	3	4	N	N	N	N	N	N	0	2	3
31	0	1	3	N	N	N	N	N	N	0	1	3

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	N	N	N	N	N	N
4	4	5	4	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	3	4	4	N	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	N	N	N
16	N	N	N	N	N	N	N	N	N	N	N	N
17	N	N	N	N	N	N	N	N	N	N	N	N
18	N	N	N	N	N	N	N	N	N	N	N	N
19	N	N	N	N	N	N	N	N	N	N	N	N
20	N	N	N	N	N	N	N	N	N	N	N	N
21	N	N	N	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	N	N	N
23	N	N	N	N	N	N	N	N	N	N	N	N
24	3	4	4	N	N	N	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	N	N	N	N	N	N	N	N	N	N	N	N
30	N	N	N	N	N	N	N	N	N	N	N	N
31	N	N	N	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL, 2=SUBSIDENCE, 3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 9=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF JULY 1978

******* FIRST INVERSION FREQUENCY OF OCCURENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	3	0	0	0	0	0	0	0	0	0	3
101-300	16	0	0	0	0	0	0	0	0	0	16
301-500	4	0	0	0	0	0	0	0	0	0	4
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	23	0	0	0	0	0	0	0	0	0	24
---TIME 601-1200 MST											
001-100	1	1	5	9	1	0	0	0	0	0	17
101-300	2	0	0	0	0	0	0	0	0	0	2
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											5
TOTAL	3	1	5	9	1	0	0	0	0	0	24
---TIME 1201-1800 MST											
001-100	0	0	0	1	1	0	0	0	0	0	2
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											24
TOTAL	0	0	0	1	1	0	0	0	0	0	26
---TIME 1801-2400 MST											
001-100	17	0	0	0	0	0	0	0	0	0	17
101-300	8	0	0	0	0	0	0	0	0	0	8
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											0
TOTAL	25	0	0	0	0	0	0	0	0	0	25
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	21	1	5	10	2	0	0	0	0	0	39
101-300	26	0	0	0	0	0	0	0	0	0	26
301-500	4	0	0	0	0	0	0	0	0	0	4
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											30
TOTAL	51	1	5	10	2	0	0	0	0	0	99

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JULY 1978

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	2	1	0	0	0	0	0	3
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											21
TOTAL	0	0	0	2	1	0	0	0	0	0	24
---TIME 601-1200 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											24
TOTAL	0	0	0	0	0	0	0	0	0	0	24
---TIME 1201-1800 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											26
TOTAL	0	0	0	0	0	0	0	0	0	0	26
---TIME 1801-2400 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											25
TOTAL	0	0	0	0	0	0	0	0	0	0	25
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	0	2	1	0	0	0	0	0	3
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											96
TOTAL	0	0	0	2	1	0	0	0	0	0	99

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JULY 1978

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	E	E	E	E
4	E	E	E	D	E	B	C	D	D	E	D	D
5	D	D	D	E	D	D	D	D	C	D	E	E
6	F	F	F	D	C	B	C	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	C	C	C	C	F	F
11	F	F	F	D	C	C	D	D	D	D	E	E
12	F	F	F	D	C	C	C	C	C	D	F	F
13	F	F	F	D	C	C	C	C	D	D	F	F
14	F	F	F	D	C	C	C	C	C	C	F	F
15	F	F	F	D	B	A	C	D	D	D	E	E
16	D	D	D	C	D	C	D	C	D	D	E	D
17	D	D	D	D	D	D	D	D	D	D	E	E
18	F	E	E	E	D	D	U	D	D	D	E	E
19	E	E	E	D	C	C	C	B	B	D	F	F
20	F	E	D	D	C	C	C	C	D	D	F	F
21	F	F	F	D	C	C	C	C	C	D	E	E
22	E	E	E	D	C	C	C	C	C	D	F	F
23	F	F	F	D	C	B	C	D	D	E	F	F
24	F	F	F	D	C	C	C	C	D	U	F	F
25	F	F	F	D	C	C	C	C	D	F	F	F
26	F	F	F	D	C	C	C	C	D	D	E	D
27	D	D	D	U	C	C	C	C	C	D	F	F
28	F	F	F	D	E	B	C	C	D	D	E	E
29	F	F	F	D	C	C	C	C	D	D	F	F
30	F	F	F	D	C	C	C	C	D	E	E	E
31	E	F	D	C	C	C	C	C	D	D	E	E

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.3 % B= 2.4 % C=21.5 % D=23.7 % E=11.3 % F=18.8 %

U= 0.8 % M=21.2 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF AUGUST 1978

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	0	3	3	N	N	N	N	N	N	0	3	3
2	0	2	3	N	N	N	N	N	N	0	2	4
3	0	3	4	N	N	N	N	N	N	N	N	N
4	0	4	4	N	N	N	N	N	N	0	2	4
5	0	4	4	N	N	N	N	N	N	0	1	4
6	0	2	4	N	N	N	N	N	N	N	N	N
7	0	3	4	N	N	N	N	N	N	0	2	4
8	0	4	4	N	N	N	N	N	N	0	2	4
9	0	3	4	N	N	N	N	N	N	0	1	4
10	0	3	4	1	3	4	N	N	N	0	1	3
11	0	2	4	N	N	N	N	N	N	0	1	4
12	0	3	4	1	2	4	N	N	N	N	N	N
13	0	1	4	N	N	N	N	N	N	0	2	4
14	0	3	4	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	0	1	4
16	0	1	4	N	N	N	N	N	N	0	1	3
17	0	1	4	N	N	N	N	N	N	0	1	4
18	0	2	3	0	1	3	N	N	N	0	1	4
19	0	2	4	N	N	N	N	N	N	0	2	4
20	0	2	4	2	3	4	N	N	N	N	N	N
21	3	4	4	N	N	N	N	N	N	0	1	4
22	0	4	4	3	4	4	N	N	N	0	3	3
23	0	2	3	N	N	N	N	N	N	0	2	4
24	0	5	4	3	4	4	N	N	N	0	1	4
25	0	4	4	0	1	4	N	N	N	0	1	4
26	0	2	4	N	N	N	N	N	N	0	2	4
27	0	3	4	2	3	4	N	N	N	0	2	4
28	0	3	4	3	4	4	N	N	N	M	M	M
29	M	M	M	M	M	M	M	M	M	M	M	M
30	M	M	M	M	M	M	M	M	M	M	M	M
31	M	M	M	M	M	M	M	M	M	M	M	M

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	N	N	N	N	N	N	N	N	N	N	N	N
2	N	N	N	N	N	N	N	N	N	N	N	N
3	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	N	N	N
7	N	N	N	N	N	N	N	N	N	N	N	N
8	N	N	N	N	N	N	N	N	N	N	N	N
9	N	N	N	N	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	N	N	N
16	N	N	N	N	N	N	N	N	N	N	N	N
17	3	4	4	N	N	N	N	N	N	N	N	N
18	4	5	4	3	4	4	N	N	N	N	N	N
19	N	N	N	N	N	N	N	N	N	4	5	4
20	3	4	4	N	N	N	N	N	N	2	3	4
21	N	N	N	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	N	N	N
23	N	N	N	N	N	N	N	N	N	N	N	N
24	N	N	N	N	N	N	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	M	M	M
29	M	M	M	M	M	M	M	M	M	M	M	M
30	M	M	M	M	M	M	M	M	M	M	M	M
31	M	M	M	M	M	M	M	M	M	M	M	M

NOTE: FOR TYPE 1=FRONTAL, 2=SUBSIDENCE, 3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 9=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF AUGUST 1978

******* FIRST INVERSION FREQUENCY OF OCCURENCE TABLE *******

THICKNESS (METERS)	SFC - 100	100 - 200	200 - 300	300 - 400	400 - 500	500 - 600	600 - 700	700 - 800	800 - 900	900 -	TOTAL
---TIME 0- 600 MST											
001-100	3	0	0	1	0	0	0	0	0	0	4
101-300	17	0	0	0	0	0	0	0	0	0	17
301-500	6	0	0	0	0	0	0	0	0	0	6
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	26	0	0	1	0	0	0	0	0	0	28
---TIME 601-1200 MST											
001-100	2	1	2	3	0	0	0	0	0	0	8
101-300	0	1	0	0	0	0	0	0	0	0	1
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											19
TOTAL	2	2	2	3	0	0	0	0	0	0	28
---TIME 1201-1800 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											28
TOTAL	0	0	0	0	0	0	0	0	0	0	28
---TIME 1801-2400 MST											
001-100	11	0	0	0	0	0	0	0	0	0	11
101-300	11	0	0	0	0	0	0	0	0	0	11
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											5
TOTAL	22	0	0	0	0	0	0	0	0	0	27
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	16	1	2	4	0	0	0	0	0	0	23
101-300	28	1	0	0	0	0	0	0	0	0	29
301-500	6	0	0	0	0	0	0	0	0	0	6
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											53
TOTAL	50	2	2	4	0	0	0	0	0	0	111

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF AUGUST 1978

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	2	1	0	0	0	0	0	3
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											25
TOTAL	0	0	0	2	1	0	0	0	0	0	26
---TIME 601-1200 MST											
001-100	0	0	0	1	0	0	0	0	0	0	1
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											27
TOTAL	0	0	0	1	0	0	0	0	0	0	28
---TIME 1201-1800 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											28
TOTAL	0	0	0	0	0	0	0	0	0	0	28
---TIME 1801-2400 MST											
001-100	0	0	1	0	1	0	0	0	0	0	2
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											25
TOTAL	0	0	1	0	1	0	0	0	0	0	27
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	1	3	2	0	0	0	0	0	6
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											105
TOTAL	0	0	1	3	2	0	0	0	0	0	111

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF AUGUST 1978

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	E	E	E	D	C	C	D	D	E	E	E	E
2	E	E	E	D	C	C	C	B	C	D	F	F
3	F	F	F	D	B	B	C	C	C	D	D	F
4	F	F	F	D	C	C	C	C	D	F	F	F
5	F	E	E	D	C	C	C	C	D	E	F	F
6	F	F	F	D	C	C	C	D	U	U	D	F
7	F	F	F	D	C	C	C	C	C	D	F	F
8	F	F	F	D	C	C	C	C	C	D	F	F
9	F	F	F	D	C	C	C	C	D	D	E	D
10	F	F	F	F	D	C	C	C	D	E	E	E
11	F	F	F	D	C	C	C	C	D	D	F	F
12	F	F	F	D	C	C	D	D	D	D	D	E
13	D	D	E	D	C	C	D	D	D	D	E	E
14	E	E	E	D	C	C	C	C	D	D	D	D
15	D	D	D	U	D	D	D	D	D	E	D	D
16	D	D	D	D	C	D	D	D	C	D	E	D
17	D	D	D	D	D	D	C	C	D	D	E	D
18	E	E	E	E	D	C	D	C	D	E	E	E
19	E	E	E	D	D	C	C	D	E	D	E	E
20	E	E	D	D	D	D	D	D	D	D	D	D
21	D	D	D	D	C	D	C	C	C	D	E	E
22	E	E	E	D	D	D	D	D	D	E	D	D
23	D	D	E	D	C	C	C	D	C	D	F	F
24	F	F	F	D	C	C	C	C	D	D	F	F
25	F	E	E	E	D	C	C	C	D	D	F	F
26	F	E	E	D	C	C	C	C	D	D	F	F
27	F	F	F	D	C	C	C	C	D	F	F	F
28	F	F	F	D	B	B	C	M	M	M	M	M
29	M	M	M	M	M	M	M	M	M	M	M	M
30	M	M	M	M	M	M	M	M	M	M	M	M
31	M	M	M	M	M	M	M	M	M	M	M	M

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 1.3 % C=21.8 % D=32.8 % E=14.5 % F=17.7 %

U= 0.8 % M=11.0 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF OCTOBER 1978

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	N	N	N	0	2	4
13	0	4	4	0	4	4	N	N	N	0	2	4
14	0	3	4	0	4	4	3	4	2	0	2	4
15	0	4	4	3	4	4	4	5	2	0	1	4
16	0	2	4	0	3	4	3	4	2	0	2	4
17	0	3	4	0	3	4	N	N	N	0	2	4
18	0	4	4	0	4	4	4	5	2	0	2	4
19	0	4	4	0	4	4	3	4	4	0	2	4
20	0	5	4	0	4	4	N	N	N	0	2	3
21	0	2	3	0	2	3	N	N	N	0	3	4
22	0	4	4	0	3	4	N	N	N	0	3	4
23	0	3	4	0	3	4	N	N	N	0	2	3
24	N	N	N	N	N	N	N	N	N	0	3	4
25	0	4	4	0	3	4	N	N	N	0	2	4
26	0	4	4	0	4	4	N	N	N	0	2	4
27	0	2	4	N	N	N	N	N	N	0	1	4
28	0	1	4	N	N	N	N	N	N	0	1	4
29	0	2	4	N	N	N	N	N	N	0	1	4
30	0	2	4	0	1	4	N	N	N	0	2	4
31	0	3	4	0	3	4	N	N	N	0	2	4

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	4	5	2
15	N	N	N	6	7	2	N	N	N	4	5	2
16	4	5	2	4	5	2	N	N	N	N	N	N
17	N	N	N	N	N	N	N	N	N	N	N	N
18	N	N	N	N	N	N	N	N	N	4	5	2
19	N	N	N	N	N	N	N	N	N	3	4	4
20	N	N	N	N	N	N	N	N	N	N	N	N
21	N	N	N	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	N	N	N
23	4	5	4	4	5	4	N	N	N	N	N	N
24	N	N	N	N	N	N	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	N	N	N	N	N	N	N	N	N	N	N	N
30	N	N	N	N	N	N	N	N	N	N	N	N
31	N	N	N	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL, 2=SUBSIDENCE, 3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 5=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF OCTOBER 1978

******* FIRST INVERSION FREQUENCY OF OCCURENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	1	0	0	0	0	0	0	0	0	0	1
101-300	9	0	0	0	0	0	0	0	0	0	9
301-500	8	0	0	0	0	0	0	0	0	0	8
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	18	0	0	0	0	0	0	0	0	0	19
---TIME 601-1200 MST											
001-100	1	0	0	1	0	0	0	0	0	0	2
101-300	7	0	0	0	0	0	0	0	0	0	7
301-500	6	0	0	0	0	0	0	0	0	0	6
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											4
TOTAL	14	0	0	1	0	0	0	0	0	0	19
---TIME 1201-1800 MST											
001-100	0	0	0	3	2	0	0	0	0	0	5
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											15
TOTAL	0	0	0	3	2	0	0	0	0	0	20
---TIME 1801-2400 MST											
001-100	4	0	0	0	0	0	0	0	0	0	4
101-300	16	0	0	0	0	0	0	0	0	0	16
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											0
TOTAL	20	0	0	0	0	0	0	0	0	0	20
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	6	0	0	4	2	0	0	0	0	0	12
101-300	32	0	0	0	0	0	0	0	0	0	32
301-500	14	0	0	0	0	0	0	0	0	0	14
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											20
TOTAL	52	0	0	4	2	0	0	0	0	0	78

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF OCTOBER 1978

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	0	2	0	0	0	0	0	2
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											17
TOTAL	0	0	0	0	2	0	0	0	0	0	19
---TIME 601-1200 MST											
001-100	0	0	0	0	2	0	1	0	0	0	3
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											16
TOTAL	0	0	0	0	2	0	1	0	0	0	19
---TIME 1201-1800 MST											
001-100	0	0	0	0	0	0	0	0	0	0	0
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											20
TOTAL	0	0	0	0	0	0	0	0	0	0	20
---TIME 1801-2400 MST											
001-100	0	0	0	1	3	0	0	0	0	0	4
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											16
TOTAL	0	0	0	1	3	0	0	0	0	0	20
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	0	1	7	0	1	0	0	0	9
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											69
TOTAL	0	0	0	1	7	0	1	0	0	0	78

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF OCTOBER 1978

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	C	C	D	F	F	F
13	F	F	F	E	D	B	C	C	D	F	F	F
14	F	F	F	F	D	B	C	C	D	F	F	F
15	F	F	F	D	C	C	C	C	D	E	E	E
16	E	E	E	E	D	B	C	C	D	D	E	E
17	E	E	E	E	D	B	C	C	D	F	F	F
18	F	F	F	F	D	C	C	C	D	F	F	F
19	F	F	F	F	D	B	C	C	D	F	F	F
20	F	E	E	E	D	B	C	C	D	D	F	F
21	E	D	E	D	D	D	D	D	D	E	F	F
22	F	F	F	F	D	B	C	C	D	E	E	E
23	E	E	E	E	D	C	C	D	E	E	E	E
24	D	D	D	D	D	D	D	D	E	F	F	F
25	F	E	E	E	D	B	C	C	E	F	F	F
26	F	F	F	F	D	B	C	C	E	E	F	F
27	E	E	D	D	D	D	D	D	D	E	E	D
28	D	E	E	D	B	B	C	D	E	E	E	E
29	E	D	D	D	D	D	D	D	U	E	E	E
30	E	E	E	E	D	C	C	B	D	E	F	F
31	F	F	F	E	D	C	C	C	D	F	F	F

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 3.2 % C= 9.4 % D=16.7 % E=15.6 % F=17.7 %

U= 0.3 % M=37.1 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF NOVEMBER 1978

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	0	3	4	5	6	2	4	5	2	0	2	4
2	0	4	4	0	4	4	N	N	N	0	2	4
3	N	N	N	N	N	N	0	2	3	0	2	3
4	N	N	N	N	N	N	N	N	N	0	1	4
5	0	2	4	0	1	4	N	N	N	0	1	4
6	0	2	4	0	2	4	N	N	N	0	2	4
7	0	2	4	0	2	4	N	N	N	0	2	3
8	N	N	N	N	N	N	N	N	N	0	2	3
9	N	N	N	N	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	0	2	4
11	0	2	4	0	2	4	N	N	N	0	1	4
12	0	2	4	N	N	N	N	N	N	0	1	4
13	N	N	N	N	N	N	N	N	N	0	2	4
14	0	4	4	0	4	4	N	N	N	0	2	4
15	0	5	4	0	5	4	4	5	5	0	1	4
16	0	3	4	0	3	4	0	3	4	0	2	4
17	N	N	N	N	N	N	N	N	N	2	3	3
18	2	3	3	N	N	N	N	N	N	N	N	N
19	N	N	N	N	N	N	N	N	N	N	N	N
20	N	N	N	N	N	N	N	N	N	0	1	4
21	0	2	4	0	2	4	N	N	N	0	2	4
22	0	2	4	0	2	4	0	3	4	0	2	4
23	0	2	4	0	2	4	0	2	4	0	2	4
24	0	2	4	0	2	4	0	2	4	0	3	4
25	0	2	4	0	3	4	N	N	N	0	2	4
26	0	2	4	0	2	4	N	N	N	0	2	4
27	0	2	4	0	2	4	N	N	N	0	2	4
28	N	N	N	N	N	N	0	1	3	0	1	3
29	0	2	4	0	3	4	0	2	4	0	3	4
30	0	4	4	0	3	4	0	2	4	N	N	N

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	5	6	2	N	N	N	N	N	N	5	6	2
2	N	N	N	N	N	N	N	N	N	N	N	N
3	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	N	N	N
7	N	N	N	N	N	N	N	N	N	N	N	N
8	N	N	N	N	N	N	N	N	N	N	N	N
9	N	N	N	N	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	4	5	4
16	4	5	4	5	6	4	5	6	4	4	4	4
17	N	N	N	N	N	N	N	N	N	N	N	N
18	N	N	N	N	N	N	N	N	N	N	N	N
19	N	N	N	N	N	N	N	N	N	N	N	N
20	N	N	N	N	N	N	N	N	N	N	N	N
21	N	N	N	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	4	5	4
23	3	4	4	3	4	4	3	4	4	4	5	4
24	3	4	4	4	5	4	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	N	N	N	N	N	N	N	N	N	N	N	N
30	N	N	N	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL, 2=SUBSIDENCE, 3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 9=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF NOVEMBER 1978

******* FIRST INVERSION FREQUENCY OF OCCURENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	1	0	0	0	0	0	0	0	1
101-300	15	0	0	0	0	0	0	0	0	0	15
301-500	4	0	0	0	0	0	0	0	0	0	4
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											10
TOTAL	19	0	1	0	0	0	0	0	0	0	30
---TIME 601-1200 MST											
001-100	1	0	0	0	0	1	0	0	0	0	2
101-300	13	0	0	0	0	0	0	0	0	0	13
301-500	3	0	0	0	0	0	0	0	0	0	3
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											12
TOTAL	17	0	0	0	0	1	0	0	0	0	30
---TIME 1201-1800 MST											
001-100	1	0	0	0	2	0	0	0	0	0	3
101-300	7	0	0	0	0	0	0	0	0	0	7
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											20
TOTAL	8	0	0	0	2	0	0	0	0	0	30
---TIME 1801-2400 MST											
001-100	7	0	1	0	0	0	0	0	0	0	8
101-300	18	0	0	0	0	0	0	0	0	0	18
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											4
TOTAL	25	0	1	0	0	0	0	0	0	0	30
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	9	0	2	0	2	1	0	0	0	0	14
101-300	53	0	0	0	0	0	0	0	0	0	53
301-500	7	0	0	0	0	0	0	0	0	0	7
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											46
TOTAL	69	0	2	0	2	1	0	0	0	0	120

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF NOVEMBER 1978

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	2	1	1	0	0	0	0	4
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											26
TOTAL	0	0	0	2	1	1	0	0	0	0	30
---TIME 601-1200 MST											
001-100	0	0	0	1	1	1	0	0	0	0	3
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											27
TOTAL	0	0	0	1	1	1	0	0	0	0	30
---TIME 1201-1800 MST											
001-100	0	0	0	1	0	1	0	0	0	0	2
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											28
TOTAL	0	0	0	1	0	1	0	0	0	0	30
---TIME 1801-2400 MST											
001-100	0	0	0	0	4	1	0	0	0	0	5
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											25
TOTAL	0	0	0	0	4	1	0	0	0	0	30
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	0	4	6	4	0	0	0	0	14
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											106
TOTAL	0	0	0	4	6	4	0	0	0	0	120

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF NOVEMBER 1978

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	F	F	F	D	D	C	B	B	D	F	F	F
2	F	F	F	F	D	B	E	D	D	E	E	E
3	D	D	D	D	D	D	D	E	D	D	D	D
4	D	D	D	D	D	D	D	D	D	E	F	F
5	F	F	F	F	D	C	C	D	D	E	E	E
6	E	E	E	E	D	C	C	D	E	E	E	E
7	E	E	E	E	D	D	D	D	E	E	D	D
8	D	D	D	E	D	D	D	D	D	E	D	E
9	D	D	D	D	D	D	D	D	D	D	D	D
10	D	D	D	D	D	C	C	C	E	E	E	E
11	F	E	E	F	D	C	C	C	D	D	F	F
12	F	E	E	D	D	D	D	D	D	D	E	D
13	D	D	D	D	D	B	C	C	F	E	E	E
14	E	E	E	E	D	B	C	C	D	F	F	F
15	F	F	F	E	D	B	C	B	D	E	E	E
16	E	D	E	D	D	D	D	D	D	E	E	E
17	D	D	D	D	D	D	D	D	D	D	D	D
18	D	D	D	D	D	D	D	D	D	D	D	D
19	D	D	D	D	D	D	D	D	D	D	D	D
20	D	D	D	D	D	C	C	D	D	E	E	E
21	E	F	F	F	D	C	B	B	D	F	F	F
22	F	E	D	D	D	D	D	D	D	D	D	D
23	E	E	D	D	D	E	E	E	E	E	E	E
24	E	E	E	E	D	D	E	D	D	D	D	D
25	D	D	D	E	E	D	B	D	E	E	E	E
26	E	E	D	D	D	D	B	D	D	E	E	E
27	E	E	E	D	D	D	D	D	E	E	D	D
28	D	D	D	D	D	D	E	E	E	E	E	E
29	E	E	E	E	E	E	E	E	E	E	E	E
30	E	E	D	D	D	D	D	D	D	D	D	D

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 3.3 % C= 5.3 % D=52.5 % E=29.2 % F= 9.7 %

U= 0.0 % M= 0.0 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF DECEMBER 1978

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	3	4	3	3	4	3	1	2	3	C	2	4
2	C	2	4	0	2	4	C	4	4	0	3	4
3	C	3	4	N	N	N	N	N	N	C	1	3
4	C	1	4	N	N	N	N	N	N	C	1	4
5	C	2	4	0	2	4	C	2	4	0	2	4
6	C	2	4	0	2	4	N	N	N	0	2	4
7	C	2	4	0	1	4	2	3	4	C	2	4
8	C	2	4	0	2	4	C	2	4	0	2	4
9	C	2	4	0	3	4	C	3	4	0	3	4
10	C	3	4	0	3	4	1	3	4	C	3	4
11	0	3	4	0	3	3	N	N	N	0	1	3
12	0	1	3	0	1	3	N	N	N	0	1	4
13	C	3	4	0	4	4	2	4	4	C	3	4
14	C	3	4	0	2	4	N	N	N	0	1	4
15	C	2	3	0	1	3	C	1	3	C	1	3
16	C	1	3	0	2	4	N	N	N	0	2	4
17	C	3	4	0	2	4	3	4	4	0	1	4
18	0	1	4	4	5	4	4	5	4	C	1	4
19	0	1	4	0	1	4	C	1	3	0	1	3
20	C	1	3	0	1	3	1	2	3	0	2	3
21	N	N	N	N	N	N	N	N	N	C	1	3
22	N	N	N	N	N	N	2	3	4	0	1	4
23	C	1	4	0	1	4	N	N	N	0	2	4
24	C	1	4	0	1	4	N	N	N	0	1	4
25	C	1	4	0	2	4	C	1	4	0	2	4
26	C	3	4	0	4	4	N	N	N	0	1	4
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	0	2	4	0	3	4	1	2	4	C	2	4
30	C	2	4	0	3	4	C	2	4	0	2	4
31	C	2	3	0	3	4	C	1	4	0	2	4

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	N	N	N	N	N	N	N	N	N	N	N	N
2	N	N	N	N	N	N	N	N	N	N	N	N
3	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	N	N	N
7	N	N	N	N	N	N	N	N	N	N	N	N
8	N	N	N	N	N	N	N	N	N	N	N	N
9	N	N	N	N	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	N	N	N	N	N	N
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	N	N	N
16	N	N	N	N	N	N	N	N	N	N	N	N
17	N	N	N	3	4	4	N	N	N	3	5	4
18	3	4	4	N	N	N	N	N	N	4	5	4
19	3	4	4	2	3	4	N	N	N	N	N	N
20	N	N	N	N	N	N	N	N	N	N	N	N
21	N	N	N	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	N	4	4
23	N	N	N	N	N	N	N	N	N	3	4	4
24	4	5	4	N	N	N	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	N	N	N	N	N	N	N	N	N	N	N	N
30	N	N	N	N	N	N	N	N	N	N	N	N
31	N	N	N	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL,2=SUBSIDENCE,3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 9=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF DECEMBER 1978

****** SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	2	1	C	C	C	C	C	3
101-300	C	C	0	0	C	C	C	C	0	C	0
301-500	0	0	0	0	C	C	C	C	C	C	C
501-900	0	0	0	0	0	C	C	C	0	C	0
NO INVERSION											28
TOTAL	0	0	0	2	1	C	C	C	C	0	31
---TIME 601-1200 MST											
001-100	0	0	1	1	C	C	C	C	C	C	2
101-300	C	C	0	0	C	C	C	C	0	C	0
301-500	C	C	0	0	C	C	C	C	C	C	0
501-900	C	0	0	0	C	C	C	0	0	0	0
NO INVERSION											29
TOTAL	0	0	1	1	C	C	C	C	C	C	31
---TIME 1201-1800 MST											
001-100	0	0	0	0	0	0	C	0	0	0	0
101-300	0	0	0	0	C	C	C	C	0	C	0
301-500	C	C	0	0	C	C	C	C	C	C	C
501-900	0	0	0	0	0	0	0	C	0	C	0
NO INVERSION											31
TOTAL	0	0	0	0	0	0	0	C	0	0	31
---TIME 1801-2400 MST											
001-100	0	0	0	1	1	C	C	C	0	0	2
101-300	C	C	0	1	C	C	C	C	0	0	1
301-500	C	C	0	0	C	C	C	C	0	C	0
501-900	C	C	0	0	C	C	C	C	0	C	0
NO INVERSION											28
TOTAL	C	0	0	2	1	C	C	C	0	0	31
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	C	C	1	4	2	C	C	C	C	0	7
101-300	C	C	0	1	0	C	C	C	C	0	1
301-500	C	C	C	C	C	C	C	C	C	C	0
501-900	0	0	0	0	C	C	C	C	0	0	0
NO INVERSION											116
TOTAL	C	0	1	5	2	C	C	C	C	C	124

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF DECEMBER 1978

******* FIRST INVERSION FREQUENCY OF OCCURENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	9	0	0	1	0	0	0	0	0	0	10
101-300	17	0	0	0	0	0	0	0	0	0	17
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											4
TOTAL	26	0	0	1	0	0	0	0	0	0	31
---TIME 601-1200 MST											
001-100	7	0	0	1	1	0	0	0	0	0	9
101-300	14	0	0	0	0	0	0	0	0	0	14
301-500	2	0	0	0	0	0	0	0	0	0	2
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											6
TOTAL	23	0	0	1	1	0	0	0	0	0	31
---TIME 1201-1800 MST											
001-100	4	3	2	1	1	0	0	0	0	0	11
101-300	4	1	1	0	0	0	0	0	0	0	6
301-500	1	0	0	0	0	0	0	0	0	0	1
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											13
TOTAL	9	4	3	1	1	0	0	0	0	0	31
---TIME 1801-2400 MST											
001-100	13	0	0	0	0	0	0	0	0	0	13
101-300	16	0	0	0	0	0	0	0	0	0	16
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											2
TOTAL	29	0	0	0	0	0	0	0	0	0	31
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	33	3	2	3	2	0	0	0	0	0	43
101-300	51	1	1	0	0	0	0	0	0	0	53
301-500	3	0	0	0	0	0	0	0	0	0	3
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											25
TOTAL	87	4	3	3	2	0	0	0	0	0	124

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF DECEMBER 1978

******** TWO HOUR STABILITY ANALYSIS ********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	D	E	D	E	D	D	D	D	C	C	E	E
2	E	E	D	D	D	D	D	D	D	D	D	D
3	D	D	D	D	D	D	E	E	E	D	E	D
4	E	D	D	D	D	D	D	C	E	E	E	E
5	F	E	E	E	E	E	E	E	E	E	E	E
6	E	E	E	E	E	D	C	C	E	F	F	F
7	F	E	E	E	E	D	D	D	D	D	E	D
8	E	D	D	D	D	D	D	D	D	D	D	D
9	D	D	D	E	D	D	D	D	D	D	D	D
10	D	D	E	E	E	D	B	C	E	E	E	D
11	D	D	D	D	E	D	D	D	D	E	E	E
12	E	D	D	E	D	D	D	D	F	F	D	F
13	F	F	F	F	F	D	D	C	E	E	E	E
14	E	E	E	D	D	D	D	D	E	E	F	F
15	E	D	D	D	D	D	D	F	F	F	E	E
16	E	E	E	E	E	D	D	D	D	E	E	E
17	E	E	E	E	E	E	D	D	D	E	E	E
18	D	D	D	D	D	D	D	D	D	D	E	D
19	D	D	D	D	D	E	D	D	E	D	D	D
20	E	E	D	D	D	D	D	D	E	E	D	D
21	D	D	D	D	D	D	D	E	E	E	E	E
22	D	D	D	D	D	D	D	D	E	E	E	E
23	E	F	F	E	E	D	D	D	D	E	D	D
24	D	D	D	D	D	D	D	E	E	E	F	F
25	F	F	F	E	F	F	D	D	D	E	F	F
26	F	E	E	E	E	D	D	D	E	D	D	D
27	D	D	D	D	D	D	D	D	D	D	D	D
28	D	D	D	D	D	D	D	D	D	D	D	D
29	E	F	F	F	D	D	D	E	E	F	F	D
30	D	D	D	D	D	D	D	D	D	D	D	D
31	E	E	E	F	E	E	D	D	D	F	F	F

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 1.1 % C= 1.9 % D=58.1 % E=28.5 % F=10.5 %

U= 0.0 % M= 0.0 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JANUARY 1979

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	C	5	4	0	4	4	C	2	4	C	2	4
2	C	2	4	0	2	4	N	N	N	C	3	4
3	C	3	4	0	4	4	2	4	4	C	3	4
4	C	2	3	0	4	4	2	3	4	C	2	4
5	C	4	4	0	4	4	C	2	4	C	4	4
6	C	3	4	0	3	4	C	2	4	C	2	4
7	C	2	4	0	5	4	C	4	4	C	2	4
8	C	4	4	0	5	4	1	5	4	C	1	4
9	C	2	4	0	5	4	2	5	4	4	5	4
10	2	4	4	1	4	4	C	3	4	N	N	N
11	N	N	N	N	N	N	N	N	N	C	5	4
12	C	3	4	2	3	3	1	2	3	C	1	4
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	C	4	4	C	3	4
15	N	N	N	N	N	N	C	2	4	C	3	4
16	C	4	4	C	1	4	3	4	4	C	4	4
17	C	4	4	C	4	4	C	4	4	C	3	4
18	C	3	4	C	4	4	C	4	4	C	4	4
19	C	4	4	C	4	4	1	4	4	2	4	4
20	1	4	4	1	4	4	2	N	4	C	2	4
21	C	2	4	C	1	4	N	N	N	C	1	2
22	C	2	3	C	4	4	C	3	4	C	5	4
23	C	2	4	C	3	4	C	1	4	C	1	4
24	C	4	4	C	3	4	C	3	4	C	3	4
25	C	3	4	C	3	4	N	N	N	C	3	4
26	C	3	4	C	3	4	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	C	2	4
28	C	2	4	C	2	4	1	3	4	N	N	N
29	C	2	4	C	2	4	3	4	4	3	4	4
30	C	1	4	C	1	4	5	5	4	C	1	4
31	C	2	4	C	5	4	C	5	4	C	3	4

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	N	N	N	N	N	N	N	N	N	N	N	N
2	N	N	N	N	N	N	N	N	N	N	N	N
3	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	4	5	4
7	4	5	4	N	N	N	N	N	N	4	5	4
8	N	N	N	N	N	N	N	N	N	3	5	4
9	4	5	4	N	N	N	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	4	5	4	4	5	4
13	N	N	N	N	N	N	N	N	N	N	N	N
14	N	N	N	N	N	N	N	N	N	N	N	N
15	N	N	N	N	N	N	N	N	N	N	N	N
16	N	N	N	2	4	4	N	N	N	N	N	N
17	N	N	N	N	N	N	N	N	N	N	N	N
18	N	N	N	N	N	N	N	N	N	N	N	N
19	N	N	N	N	N	N	N	N	N	5	6	4
20	N	N	N	N	N	N	5	6	4	4	5	4
21	3	4	4	N	N	N	N	N	N	N	N	N
22	N	N	N	N	N	N	N	N	N	N	N	N
23	N	N	N	N	N	N	2	4	4	2	4	4
24	N	N	N	4	5	4	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	3	4	4	3	4	4	N	N	N	N	N	N
29	5	6	4	5	6	4	N	N	N	N	N	N
30	4	5	4	5	6	4	N	N	N	N	N	N
31	3	4	4	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL,2=SUBSIDENCE,3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 5=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JANUARY 1979

******* FIRST INVERSION FREQUENCY OF OCCURRENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
0C1-1CC	1	C	0	C	C	C	C	C	C	C	1
1C1-3CC	16	1	1	C	C	C	C	C	C	C	18
3C1-5CC	7	C	C	C	C	C	C	C	C	C	7
5C1-9CC	C	C	C	C	C	C	C	C	C	C	C
NO INVERSION											5
TOTAL	24	1	1	C	C	C	C	C	C	C	31
---TIME 601-1200 MST											
0C1-1CC	3	C	1	C	C	C	C	C	C	C	4
1C1-3CC	8	2	C	C	C	C	C	C	C	C	10
3C1-5CC	12	C	C	C	C	C	C	C	C	C	12
5C1-9CC	C	C	C	C	C	C	C	C	C	C	C
NO INVERSION											5
TOTAL	23	2	1	C	C	C	C	C	C	C	31
---TIME 1201-1800 MST											
0C1-1CC	1	1	1	2	C	C	C	C	C	C	5
1C1-3CC	7	2	3	1	C	C	C	C	C	C	13
3C1-5CC	5	1	C	C	C	C	C	C	C	C	6
5C1-9CC	C	C	C	C	C	C	C	C	C	C	C
NO INVERSION											7
TOTAL	13	4	4	3	C	C	C	C	C	C	31
---TIME 1801-2400 MST											
0C1-1CC	5	C	C	1	1	C	C	C	C	C	7
1C1-3CC	14	C	1	C	C	C	C	C	C	C	15
3C1-5CC	5	C	C	C	C	C	C	C	C	C	5
5C1-9CC	C	C	C	C	C	C	C	C	C	C	C
NO INVERSION											4
TOTAL	24	C	1	1	1	C	C	C	C	C	31
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
0C1-1CC	10	1	2	3	1	C	C	C	C	C	17
1C1-3CC	45	5	5	1	C	C	C	C	C	C	56
3C1-5CC	29	1	C	C	C	C	C	C	C	C	30
5C1-9CC	C	C	C	C	C	C	C	C	C	C	C
NO INVERSION											21
TOTAL	84	7	7	4	1	C	C	C	C	C	124

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JANUARY 1975

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST ----------											
001-100	0	0	0	3	3	1	0	0	0	0	7
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											24
TOTAL	0	0	0	3	3	1	0	0	0	0	31
---TIME 601-1200 MST ----------											
001-100	0	0	0	1	1	2	0	0	0	0	4
101-300	0	0	1	0	0	0	0	0	0	0	1
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											26
TOTAL	0	0	1	1	1	2	0	0	0	0	31
---TIME 1201-1800 MST ----------											
001-100	0	0	0	0	1	1	0	0	0	0	2
101-300	0	0	1	0	0	0	0	0	0	0	1
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											28
TOTAL	0	0	1	0	1	1	0	0	0	0	31
---TIME 1801-2400 MST ----------											
001-100	0	0	0	0	4	1	0	0	0	0	5
101-300	0	0	1	1	0	0	0	0	0	0	2
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											24
TOTAL	0	0	1	1	4	1	0	0	0	0	31
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	0	4	5	5	0	0	0	0	18
101-300	0	0	3	1	0	0	0	0	0	0	4
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											102
TOTAL	0	0	3	5	5	5	0	0	0	0	124

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF JANUARY 1975

******** TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	F	F	F	F	E	E	E	E	E	E	E	E
2	E	D	D	D	D	D	D	D	D	F	F	F
3	F	F	F	E	E	D	D	D	D	E	E	E
4	E	E	E	F	F	D	D	D	F	F	F	F
5	E	F	F	E	E	E	F	D	D	F	F	F
6	F	F	F	F	F	F	F	D	D	E	E	E
7	E	E	E	E	F	F	F	F	F	F	F	F
8	F	D	D	D	D	D	D	D	F	F	F	F
9	F	E	E	E	D	D	D	B	D	D	D	D
10	D	D	D	D	D	E	D	D	D	D	D	D
11	D	D	D	D	D	D	M	M	E	D	D	D
12	D	D	D	D	D	D	D	D	E	D	D	D
13	D	D	D	D	D	D	D	M	M	M	M	M
14	M	M	M	M	E	E	E	E	E	D	D	D
15	D	D	D	D	D	D	E	D	E	F	D	D
16	D	D	D	D	D	D	D	D	D	E	D	D
17	D	D	D	D	D	D	F	F	F	F	F	F
18	E	E	D	D	D	D	D	D	F	E	E	E
19	D	D	D	D	D	D	D	D	D	D	D	D
20	D	D	D	D	D	D	D	D	D	D	E	D
21	D	D	D	D	D	D	D	D	D	E	E	E
22	E	F	F	F	E	E	E	E	D	D	D	E
23	E	E	E	E	E	D	D	D	E	E	E	E
24	D	D	D	D	D	D	F	E	E	E	E	E
25	E	F	F	F	D	F	D	D	D	E	E	E
26	E	E	E	E	E	D	D	M	M	M	M	M
27	D	D	D	D	D	D	M	D	D	E	D	F
28	E	E	E	E	E	E	D	D	D	D	D	E
29	D	D	D	D	D	D	D	D	D	D	D	D
30	D	E	D	E	E	D	D	D	D	D	E	E
31	E	E	E	E	E	E	E	E	E	E	E	E

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 0.3 % C= 0.0 % D=50.8 % E=28.2 % F=16.1 %

U= 0.0 % M= 4.6 %

NOTE: U=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF FEBRUARY 1979

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	3	4	4	0	3	4	0	2	4	0	2	4
2	0	2	4	0	4	4	0	3	4	0	2	4
3	0	3	+	0	3	4	N	N	N	N	N	N
4	N	N	N	N	N	N	0	6	4	0	5	4
5	0	4	3	0	2	3	N	N	N	0	1	3
6	0	2	3	0	2	3	2	3	3	0	3	3
7	0	2	3	0	2	3	N	N	N	0	1	4
8	0	3	4	0	4	4	2	4	4	0	1	4
9	2	3	4	2	3	4	0	2	3	0	2	3
10	0	2	3	0	3	3	0	2	3	0	2	3
11	0	2	3	0	2	3	0	2	4	0	3	4
12	0	2	3	0	3	3	0	2	3	0	2	3
13	0	3	3	0	2	3	0	2	3	0	2	3
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	M	M	M	M	M	M
24	M	M	M	M	M	M	M	M	M	M	M	M
25	M	M	M	M	M	M	M	M	M	M	M	M
26	M	M	M	M	M	M	M	M	M	M	M	M
27	M	M	M	M	M	M	M	M	M	M	M	M
28	M	M	M	M	M	M	M	M	M	M	M	M

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	N	N	N	N	N	N	N	N	N	N	N	N
2	N	N	N	N	N	N	4	5	4	3	4	4
3	N	N	N	N	N	N	N	N	N	N	N	N
4	N	N	N	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N	N	N	N
6	N	N	N	N	N	N	N	N	N	N	N	N
7	N	N	N	N	N	N	N	N	N	N	N	N
8	N	N	N	N	N	N	N	N	N	2	4	4
9	4	5	4	4	5	4	N	N	N	N	N	N
10	N	N	N	N	N	N	N	N	N	N	N	N
11	N	N	N	N	N	N	N	N	N	N	N	N
12	N	N	N	N	N	N	N	N	N	N	N	N
13	N	N	N	3	4	4	N	N	N	N	N	N
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	M	M	M	M	M	M
24	M	M	M	M	M	M	M	M	M	M	M	M
25	M	M	M	M	M	M	M	M	M	M	M	M
26	M	M	M	M	M	M	M	M	M	M	M	M
27	M	M	M	M	M	M	M	M	M	M	M	M
28	M	M	M	M	M	M	M	M	M	M	M	M

NOTE: FOR TYPE 1=FRONTAL,2=SUBSIDENCE,3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 9=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF FEBRUARY 1979

******* FIRST INVERSION FREQUENCY OF OCCURRENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0000-0600 MST											
0001-0100	0	0	1	1	0	0	0	0	0	0	2
0101-0300	9	0	0	0	0	0	0	0	0	0	9
0301-0500	1	0	0	0	0	0	0	0	0	0	1
0501-0900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	10	0	1	1	0	0	0	0	0	0	13
---TIME 0601-1200 MST											
0001-0100	0	0	1	0	0	0	0	0	0	0	1
0101-0300	9	0	0	0	0	0	0	0	0	0	9
0301-0500	2	0	0	0	0	0	0	0	0	0	2
0501-0900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	11	0	1	0	0	0	0	0	0	0	13
---TIME 1201-1800 MST											
0001-0100	0	0	1	0	0	0	0	0	0	0	1
0101-0300	7	0	1	0	0	0	0	0	0	0	8
0301-0500	0	0	0	0	0	0	0	0	0	0	0
0501-0900	1	0	0	0	0	0	0	0	0	0	1
NO INVERSION											3
TOTAL	8	0	2	0	0	0	0	0	0	0	13
---TIME 1801-2400 MST											
0001-0100	3	0	0	0	0	0	0	0	0	0	3
0101-0300	8	0	0	0	0	0	0	0	0	0	8
0301-0500	1	0	0	0	0	0	0	0	0	0	1
0501-0900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											1
TOTAL	12	0	0	0	0	0	0	0	0	0	13
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
0001-0100	3	0	3	1	0	0	0	0	0	0	7
0101-0300	33	0	1	0	0	0	0	0	0	0	34
0301-0500	4	0	0	0	0	0	0	0	0	0	4
0501-0900	1	0	0	0	0	0	0	0	0	0	1
NO INVERSION											6
TOTAL	41	0	4	1	0	0	0	0	0	0	52

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF FEBRUARY 1979

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	0	0	0	0	1	0	0	0	0	0	1
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											12
TOTAL	0	0	0	0	1	0	0	0	0	0	13
---TIME 601-1200 MST											
001-100	0	0	0	1	1	0	0	0	0	0	2
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											11
TOTAL	0	0	0	1	1	0	0	0	0	0	13
---TIME 1201-1800 MST											
001-100	0	0	0	0	1	0	0	0	0	0	1
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											12
TOTAL	0	0	0	0	1	0	0	0	0	0	13
---TIME 1801-2400 MST											
001-100	0	0	0	1	0	0	0	0	0	0	1
101-300	0	0	1	0	0	0	0	0	0	0	1
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											11
TOTAL	0	0	1	1	0	0	0	0	0	0	13
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
001-100	0	0	0	2	3	0	0	0	0	0	5
101-300	0	0	1	0	0	0	0	0	0	0	1
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											46
TOTAL	0	0	1	2	3	0	0	0	0	0	52

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF FEBRUARY 1979

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	D	D	D	D	E	D	D	F	F	E	E	E
2	D	D	D	D	D	E	D	D	D	D	D	D
3	D	D	D	D	D	D	D	D	D	D	D	D
4	D	D	D	D	D	D	D	E	D	D	D	E
5	D	D	D	D	D	D	D	D	E	E	E	E
6	E	E	E	E	D	D	D	D	D	E	D	D
7	D	D	D	F	D	D	D	D	E	F	F	F
8	F	F	F	F	E	D	D	D	D	E	D	D
9	D	D	D	D	D	E	D	D	D	D	D	D
10	D	E	E	E	D	D	D	D	D	D	D	D
11	D	D	E	E	E	E	E	D	D	E	D	D
12	D	D	D	D	D	D	D	E	E	D	D	D
13	D	D	D	D	D	D	E	E	E	E	E	M
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	M	M	M	M	M	M
24	M	M	M	M	M	M	M	M	M	M	M	M
25	M	M	M	M	M	M	M	M	M	M	M	M
26	M	M	M	M	M	M	M	M	M	M	M	M
27	M	M	M	M	M	M	M	M	M	M	M	M
28	M	M	M	M	M	M	M	M	M	M	M	M

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 0.0 % C= 0.0 % D=32.4 % E=10.7 % F= 3.0 %

L= 0.0 % M=53.9 %

NOTE: L=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF MARCH 1975

********** FIRST INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	M	M	M	M	M	M
13	M	M	M	M	M	M	M	M	M	M	M	M
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	N	N	N	0	2	4
24	C	2	4	0	2	4	N	N	N	N	N	N
25	2	3	3	N	N	N	N	N	N	1	2	3
26	1	2	3	3	4	3	3	4	3	3	4	3
27	3	4	3	N	N	N	N	N	N	N	N	N
28	2	3	3	N	N	N	N	N	N	0	3	4
29	C	4	4	0	3	4	N	N	N	0	2	4
30	C	1	4	N	N	N	N	N	N	0	1	4
31	C	1	4	N	N	N	N	N	N	N	N	N

********** SECOND INVERSION **********

DAY	0000-0600 MST BASE (100M)	TOP (100M)	TYPE *	0601-1200 MST BASE (100M)	TOP (100M)	TYPE *	1201-1800 MST BASE (100M)	TOP (100M)	TYPE *	1801-2400 MST BASE (100M)	TOP (100M)	TYPE *
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	M	M	M	M	M	M
13	M	M	M	M	M	M	M	M	M	M	M	M
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	N	N	N	N	N	N
24	3	4	4	3	4	4	N	N	N	N	N	N
25	N	N	N	N	N	N	N	N	N	N	N	N
26	N	N	N	N	N	N	N	N	N	N	N	N
27	N	N	N	N	N	N	N	N	N	N	N	N
28	N	N	N	N	N	N	N	N	N	N	N	N
29	N	N	N	N	N	N	N	N	N	N	N	N
30	N	N	N	N	N	N	N	N	N	N	N	N
31	N	N	N	N	N	N	N	N	N	N	N	N

NOTE: FOR TYPE 1=FRONTAL,2=SUBSIDENCE,3=RADIATION (SPIKED ECHO)
4=RADIATION (LAMINAR ECHO) 5=UNKNOWN
N=NO INVERSION M=MISSING DATA OR UNKNOWN

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY — MONTH OF MARCH 1975

******* FIRST INVERSION FREQUENCY OF OCCURRENCE TABLE *******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
001-100	2	1	2	1	0	0	0	0	0	0	6
101-300	1	0	0	0	0	0	0	0	0	0	1
301-500	1	0	0	0	0	0	0	0	0	0	1
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											0
TOTAL	4	1	2	1	0	0	0	0	0	0	8
---TIME 601-1200 MST											
001-100	0	0	0	1	0	0	0	0	0	0	1
101-300	2	0	0	0	0	0	0	0	0	0	2
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											5
TOTAL	2	0	0	1	0	0	0	0	0	0	8
---TIME 1201-1800 MST											
001-100	0	0	0	1	0	0	0	0	0	0	1
101-300	0	0	0	0	0	0	0	0	0	0	0
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											8
TOTAL	0	0	0	1	0	0	0	0	0	0	9
---TIME 1801-2400 MST											
001-100	1	1	0	1	0	0	0	0	0	0	3
101-300	3	0	0	0	0	0	0	0	0	0	3
301-500	0	0	0	0	0	0	0	0	0	0	0
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											3
TOTAL	4	1	0	1	0	0	0	0	0	0	9
---------- FREQUENCY SUMMARY FOR FIRST INVERSION ----------											
001-100	3	2	2	4	0	0	0	0	0	0	11
101-300	6	0	0	0	0	0	0	0	0	0	6
301-500	1	0	0	0	0	0	0	0	0	0	1
501-900	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											16
TOTAL	10	2	2	4	0	0	0	0	0	0	34

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF MARCH 1979

******* SECOND INVERSION FREQUENCY OF OCCURENCE TABLE ******

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (IN METERS) 100	200	300	400	500	600	700	800	900	TOTAL
---TIME 0- 600 MST											
0C1-1CC	0	0	0	1	0	0	0	0	0	0	1
1C1-3CC	0	0	0	0	0	0	0	0	0	0	0
3C1-5CC	0	0	0	0	0	0	0	0	0	0	0
5C1-9CC	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											7
TOTAL	0	0	0	1	0	0	0	0	0	0	8
---TIME 601-1200 MST											
0C1-1CC	0	0	0	1	0	0	0	0	0	0	1
1C1-3CC	0	0	0	0	0	0	0	0	0	0	0
3C1-5CC	0	0	0	0	0	0	0	0	0	0	0
5C1-9CC	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											7
TOTAL	0	0	0	1	0	0	0	0	0	0	8
---TIME 1201-1800 MST											
0C1-1CC	0	0	0	0	0	0	0	0	0	0	0
1C1-3CC	0	0	0	0	0	0	0	0	0	0	0
3C1-5CC	0	0	0	0	0	0	0	0	0	0	0
5C1-9CC	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											9
TOTAL	0	0	0	0	0	0	0	0	0	0	9
---TIME 1801-2400 MST											
0C1-1CC	0	0	0	0	0	0	0	0	0	0	0
1C1-3CC	0	0	0	0	0	0	0	0	0	0	0
3C1-5CC	0	0	0	0	0	0	0	0	0	0	0
5C1-9CC	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											9
TOTAL	0	0	0	0	0	0	0	0	0	0	9
---------- FREQUENCY SUMMARY FOR SECOND INVERSION ----------											
0C1-1CC	0	0	0	2	0	0	0	0	0	0	2
1C1-3CC	0	0	0	0	0	0	0	0	0	0	0
3C1-5CC	0	0	0	0	0	0	0	0	0	0	0
5C1-9CC	0	0	0	0	0	0	0	0	0	0	0
NO INVERSION											32
TOTAL	0	0	0	2	0	0	0	0	0	0	34

ACOUSTIC RADAR ANALYSIS

FLATHEAD ENVIRONMENTAL STUDY MONTH OF MARCH 1979

********* TWO HOUR STABILITY ANALYSIS **********

DAY	HOUR 02	04	06	08	10	12	14	16	18	20	22	24
1	M	M	M	M	M	M	M	M	M	M	M	M
2	M	M	M	M	M	M	M	M	M	M	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	M	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	M	M	M	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	M	M	M	M	M	M	M	M	M	M	M
13	M	M	M	M	M	M	M	M	M	M	M	M
14	M	M	M	M	M	M	M	M	M	M	M	M
15	M	M	M	M	M	M	M	M	M	M	M	M
16	M	M	M	M	M	M	M	M	M	M	M	M
17	M	M	M	M	M	M	M	M	M	M	M	M
18	M	M	M	M	M	M	M	M	M	M	M	M
19	M	M	M	M	M	M	M	M	M	M	M	M
20	M	M	M	M	M	M	M	M	M	M	M	M
21	M	M	M	M	M	M	M	M	M	M	M	M
22	M	M	M	M	M	M	M	M	M	M	M	M
23	M	M	M	M	M	M	M	M	C	E	C	M
24	E	E	E	E	D	C	C	C	D	D	D	D
25	D	D	D	D	D	D	C	C	D	D	D	D
26	D	D	D	D	D	D	D	D	D	D	D	D
27	D	D	D	D	D	D	D	D	D	D	D	D
28	D	D	D	D	D	D	C	D	D	E	D	D
29	D	D	D	D	D	D	D	D	D	E	E	E
30	E	E	E	E	D	D	D	D	D	E	D	D
31	D	D	E	D	D	C	D	D	D	D	D	D

PERCENT FREQUENCY OF OCCURENCE FOR EACH CATEGORY

A= 0.0 % B= 0.0 % C= 2.2 % D=20.4 % E= 3.6 % F= 0.3 %

L= 0.0 % M=73.4 %

NOTE: L=UNKNOWN M=MISSING DATA
CLOUD COVER CONDITIONS USED FROM NWS STATION AT KALISPELL
WIND DATA USED FROM NWS STATION AT KALISPELL

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1978 MONTH= 8 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
4	1500	0.25	0.14	0.09	0.07	0.33	1.34
7	900	0.12	0.04	0.03	0.04	0.35	1.76
7	1200	0.20	0.09	0.04	0.07	0.41	1.19
7	1500	0.21	0.10	0.06	0.07	0.51	1.36
8	900	0.13	0.07	0.03	0.04	0.41	1.77
9	900	0.16	0.08	0.05	0.05	0.33	1.78
9	1200	0.23	0.13	0.07	0.07	0.43	1.20
10	900	0.20	0.12	0.08	0.06	0.28	1.78
10	1200	0.19	0.09	0.05	0.04	0.13	1.21
10	1500	0.20	0.10	0.06	0.05	0.19	1.38
18	1200	0.28	0.14	0.05	0.08	0.45	1.24
26	1200	0.30	0.18	0.12	0.15	0.44	1.29
26	1500	0.20	0.13	0.09	0.11	0.40	1.50
27	1200	0.17	0.07	0.03	0.04	0.33	1.29
28	900	0.15	0.07	0.04	0.05	0.37	1.98
28	1200	0.16	0.06	0.02	0.04	0.38	1.30
29	900	0.15	0.07	0.04	0.04	0.39	2.00
29	1200	0.20	0.09	0.05	0.06	0.42	1.30
29	1500	0.18	0.09	0.05	0.06	0.42	1.53
AVERAGE		0.19	0.10	0.06	0.06	0.37	1.48
0900 AVER		0.15	0.07	0.05	0.05	0.35	1.84
1200 AVER		0.22	0.11	0.06	0.07	0.37	1.25
1500 AVER		0.21	0.11	0.07	0.07	0.37	1.42

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1978 MONTH= 9 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1	1200	0.18	0.07	0.03	0.06	0.41	1.32
3	1500	0.25	0.14	0.10	0.08	0.50	1.58
4	900	0.19	0.11	0.08	0.08	0.42	2.08
4	1200	0.22	0.11	0.06	0.06	0.44	1.34
9	1200	0.25	0.12	0.07	0.05	0.53	1.39
15	1200	0.17	0.06	0.04	0.04	0.29	1.44
16	1200	0.16	0.07	0.04	0.03	0.19	1.45
17	900	0.24	0.19	0.17	0.17	0.32	2.33
17	1200	0.19	0.10	0.06	0.05	0.19	1.46
18	900	0.19	0.12	0.06	0.06	0.22	2.35
25	1200	0.17	0.08	0.04	0.05	0.36	1.55
26	900	0.15	0.08	0.05	0.05	0.33	2.56
26	1200	0.20	0.11	0.06	0.06	0.35	1.56
26	1500	0.26	0.16	0.12	0.10	0.40	1.97
AVERAGE		0.20	0.11	0.07	0.07	0.35	1.74
0900 AVER		0.18	0.13	0.09	0.09	0.32	2.33
1200 AVER		0.19	0.09	0.05	0.05	0.34	1.44
1500 AVER		0.26	0.15	0.11	0.09	0.45	1.78

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1978 MONTH= 10 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
2	1200	0.14	0.06	0.03	0.04	0.17	1.64
4	900	0.12	0.06	0.04	0.04	0.20	2.81
4	1200	0.16	0.07	0.04	0.04	0.20	1.67
5	900	0.20	0.11	0.08	0.05	0.25	2.85
5	1200	0.24	0.13	0.07	0.06	0.25	1.68
6	900	0.17	0.11	0.07	0.06	0.24	2.87
6	1200	0.25	0.14	0.08	0.06	0.24	1.70
9	1200	0.19	0.10	0.06	0.05	0.29	1.74
9	1500	0.16	0.08	0.06	0.05	0.30	2.32
12	900	0.11	0.05	0.04	0.03	0.16	3.13
13	1500	0.14	0.08	0.06	0.06	0.30	2.45
14	1200	0.17	0.10	0.06	0.05	0.24	1.83
14	1500	0.15	0.08	0.05	0.04	0.23	2.48
15	900	0.08	0.04	0.03	0.02	0.20	3.27
15	1200	0.27	0.18	0.10	0.05	0.25	1.85
17	1500	0.29	0.19	0.14	0.09	0.37	2.58
18	900	0.19	0.12	0.09	0.06	0.29	3.41
18	1200	0.49	0.45	0.39	0.36	0.66	1.90
19	1500	0.21	0.11	0.08	0.06	0.28	2.66
24	1200	0.25	0.18	0.12	0.09	0.25	2.02
25	1500	0.35	0.22	0.18	0.12	0.33	2.91
31	1200	0.30	0.21	0.16	0.13	0.24	2.18
AVERAGE		0.21	0.13	0.09	0.07	0.27	2.36
0900 AVER		0.14	0.08	0.06	0.04	0.22	3.06
1200 AVER		0.25	0.16	0.11	0.09	0.28	1.82
1500 AVER		0.22	0.13	0.09	0.07	0.30	2.57

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1978 MONTH= 11 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1	1200	0.24	0.15	0.10	0.06	0.30	2.20
1	1500	0.22	0.14	0.10	0.06	0.28	3.23
4	1200	0.11	0.05	0.04	0.03	0.16	2.27
10	1200	0.19	0.36	0.32	0.32	0.28	2.42
11	1200	0.22	0.15	0.11	0.08	0.14	2.45
15	1200	0.21	0.14	0.09	0.07	0.19	2.56
15	1500	0.25	0.19	0.15	0.10	0.20	3.97
21	1500	0.21	0.14	0.11	0.06	0.19	4.31
AVERAGE		0.21	0.17	0.13	0.10	0.22	2.93
0900 AVER		0.0	0.0	0.0	0.0	0.0	0.0
1200 AVER		0.20	0.17	0.13	0.11	0.21	2.38
1500 AVER		0.23	0.16	0.12	0.08	0.22	3.84

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1978 MONTH= 12 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1	1200	0.27	0.25	0.22	0.16	0.25	2.96
5	900	0.06	0.07	0.08	0.07	0.13	9.80
6	1200	0.19	0.15	0.15	0.14	0.18	3.07
12	1500	0.12	0.06	0.06	0.03	0.10	5.05
13	1200	0.32	0.24	0.18	0.11	0.13	3.18
21	1200	0.09	0.05	0.04	0.03	0.10	3.24
29	1010	0.10	0.06	0.06	0.03	0.03	5.09
29	1200	0.12	0.07	0.06	0.03	0.01	3.22
29	1530	0.16	0.13	0.11	0.05	0.07	6.26
AVERAGE		0.16	0.12	0.11	0.07	0.11	4.65
0900 AVER		0.09	0.07	0.07	0.05	0.08	7.45
1200 AVER		0.20	0.15	0.13	0.09	0.14	3.13
1500 AVER		0.15	0.09	0.08	0.04	0.08	5.66

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 1 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1	1000	0.14	0.10	0.09	0.06	0.07	5.54
2	1245	0.21	0.14	0.10	0.06	0.09	3.05
4	1000	0.12	0.07	0.06	0.03	0.04	5.52
4	1200	0.12	0.07	0.05	0.03	0.01	3.16
5	1000	0.10	0.06	0.06	0.03	0.05	5.47
5	1200	0.11	0.06	0.05	0.03	0.04	3.15
5	1500	0.12	0.07	0.06	0.03	0.05	4.52
6	1200	0.25	0.18	0.13	0.07	0.08	3.13
6	1500	0.18	0.13	0.10	0.05	0.08	4.49
7	1000	0.08	0.05	0.06	0.03	0.07	5.42
7	1200	0.14	0.09	0.07	0.04	0.08	3.12
8	1000	0.14	0.10	0.09	0.05	0.08	5.37
8	1200	0.14	0.09	0.07	0.04	0.05	3.10
8	1500	0.15	0.10	0.08	0.04	0.06	4.39
17	1500	0.32	0.25	0.19	0.11	0.19	3.90
18	1500	0.21	0.16	0.13	0.08	0.18	3.86
24	1200	0.22	0.19	0.15	0.13	0.19	2.72
24	1500	0.10	0.06	0.06	0.03	0.09	3.54
25	1200	0.11	0.07	0.05	0.03	0.08	2.70
25	1500	0.26	0.18	0.13	0.06	0.14	3.49
28	1200	0.22	0.15	0.11	0.06	0.08	2.62
28	1308	0.21	0.15	0.11	0.06	0.08	2.53
29	1200	0.22	0.16	0.12	0.07	0.10	2.59
AVERAGE		0.17	0.12	0.09	0.05	0.09	3.80
0900 AVER		0.12	0.08	0.07	0.04	0.06	5.47
1200 AVER		0.18	0.12	0.09	0.06	0.08	2.90
1500 AVER		0.19	0.14	0.11	0.06	0.11	4.03

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 2 LATITUDE= 48.3

DAY HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1 1538	0.29	0.22	0.18	0.10	0.14	3.96
19 925	0.45	0.40	0.39	0.35	0.46	3.86
20 1245	0.18	0.11	0.09	0.06	0.13	1.97
20 1520	0.18	0.12	0.11	0.07	0.16	2.66
AVERAGE	0.27	0.21	0.19	0.15	0.22	3.11
0900 AVER	0.45	0.40	0.39	0.35	0.46	3.86
1200 AVER	0.18	0.11	0.09	0.06	0.13	1.97
1500 AVER	0.23	0.17	0.14	0.08	0.15	3.31

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 3 LATITUDE= 48.3

DAY HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
2 1250	0.31	0.25	0.18	0.20	0.21	1.78
3 934	0.19	0.12	0.09	0.06	0.14	2.90
3 1037	0.21	0.14	0.10	0.06	0.12	2.16
3 1138	0.20	0.13	0.08	0.06	0.10	1.87
3 1201	0.19	0.11	0.07	0.05	0.09	1.81
3 1246	0.20	0.12	0.07	0.05	0.09	1.76
9 900	0.13	0.08	0.06	0.04	0.14	3.30
9 1200	0.20	0.11	0.08	0.07	0.14	1.71
9 1526	0.14	0.08	0.06	0.06	0.16	2.23
10 900	0.10	0.06	0.05	0.04	0.18	3.24
10 1205	0.18	0.11	0.06	0.06	0.16	1.68
11 1225	0.19	0.11	0.06	0.06	0.18	1.64
12 1235	0.20	0.12	0.08	0.07	0.13	1.62
13 1015	0.16	0.10	0.08	0.07	0.14	2.07
14 900	0.21	0.15	0.14	0.13	0.23	3.01
14 1200	0.20	0.13	0.09	0.09	0.16	1.63
15 1245	0.33	0.23	0.17	0.15	0.24	1.58
18 1250	0.20	0.11	0.06	0.05	0.19	1.54
20 900	0.14	0.08	0.06	0.04	0.12	2.63
20 1230	0.22	0.12	0.07	0.06	0.13	1.49
20 1500	0.31	0.20	0.13	0.08	0.16	1.79
21 1240	0.29	0.19	0.13	0.11	0.23	1.50
21 1500	0.26	0.18	0.13	0.11	0.21	1.81
23 1200	0.28	0.18	0.14	0.11	0.27	1.51
25 1230	0.25	0.16	0.11	0.10	0.16	1.46
AVERAGE	0.21	0.13	0.09	0.08	0.16	1.99
0900 AVER	0.16	0.10	0.08	0.06	0.15	2.76
1200 AVER	0.23	0.14	0.10	0.09	0.16	1.64
1500 AVER	0.24	0.15	0.10	0.08	0.18	1.94

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 4 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
5	945	0.26	0.19	0.15	0.15	0.38	1.81
6	905	0.38	0.27	0.16	0.10	0.31	2.11
8	900	0.19	0.13	0.11	0.11	0.27	2.12
19	940	0.27	0.18	0.13	0.10	0.24	1.64
19	1455	0.44	0.26	0.15	0.09	0.22	1.48
21	1200	0.22	0.12	0.06	0.07	0.15	1.26
21	1520	0.21	0.12	0.08	0.07	0.18	1.56
27	1225	0.40	0.29	0.23	0.23	0.40	1.22
28	1245	0.42	0.31	0.25	0.24	0.40	1.21
29	945	0.33	0.23	0.18	0.16	0.38	1.51
AVERAGE		0.31	0.21	0.15	0.13	0.29	1.59
0900	AVER	0.29	0.20	0.14	0.12	0.32	1.84
1200	AVER	0.35	0.24	0.18	0.18	0.32	1.23
1500	AVER	0.32	0.19	0.12	0.08	0.20	1.52

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 5 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
2	900	0.27	0.18	0.13	0.10	0.32	1.73
2	1210	0.33	0.25	0.13	0.17	0.38	1.20
9	935	0.17	0.08	0.04	0.05	0.16	1.49
9	1200	0.19	0.09	0.03	0.05	0.13	1.18
9	1500	0.20	0.10	0.05	0.06	0.19	1.37
11	900	0.29	0.18	0.13	0.10	0.30	1.65
14	910	0.20	0.11	0.07	0.08	0.25	1.57
15	910	0.22	0.13	0.09	0.09	0.31	1.57
15	1200	0.35	0.20	0.16	0.16	0.49	1.16
20	900	0.29	0.18	0.11	0.09	0.17	1.59
20	1500	0.20	0.10	0.05	0.06	0.17	1.33
21	900	0.20	0.11	0.08	0.08	0.30	1.59
21	1200	0.22	0.11	0.06	0.08	0.24	1.14
22	900	0.20	0.11	0.07	0.07	0.33	1.58
22	1200	0.28	0.16	0.10	0.13	0.37	1.14
23	900	0.19	0.09	0.05	0.05	0.33	1.58
23	1200	0.27	0.14	0.08	0.09	0.29	1.14
23	1500	0.32	0.21	0.15	0.16	0.46	1.32
25	900	0.31	0.19	0.13	0.11	0.48	1.57
27	1215	0.30	0.18	0.12	0.13	0.24	1.13
31	1220	0.35	0.20	0.11	0.12	0.33	1.12
AVERAGE		0.25	0.15	0.09	0.10	0.30	1.39
0900	AVER	0.23	0.14	0.09	0.08	0.29	1.59
1200	AVER	0.28	0.17	0.10	0.12	0.32	1.15
1500	AVER	0.24	0.13	0.08	0.09	0.28	1.34

COLUMBIA FALLS ATMOSHERIC TURBIDITY DATA (VOLZ METHOD BASE E)

SITE ELEV (M)= 915. YEAR = 1979 MONTH= 6 LATITUDE= 48.3

DAY	HOUR	TURBIDITY 440 NM	TURBIDITY 500 NM	TURBIDITY 640 NM	TURBIDITY 880 NM	TURBIDITY 940 NM	RELATIVE AIR MASS
1	900	0.35	0.24	0.19	0.18	0.46	1.55
1	1200	0.32	0.20	0.12	0.13	0.40	1.12
2	900	0.29	0.17	0.11	0.10	0.48	1.55
2	1200	0.25	0.13	0.07	0.09	0.45	1.12
9	1500	0.26	0.13	0.08	0.08	0.40	1.27
10	1310	0.29	0.15	0.08	0.09	0.45	1.11
11	910	0.26	0.15	0.10	0.09	0.42	1.49
11	1200	0.33	0.18	0.11	0.11	0.50	1.12
13	900	0.26	0.15	0.10	0.10	0.31	1.54
13	1300	0.22	0.10	0.04	0.05	0.10	1.11
14	1230	0.24	0.12	0.07	0.08	0.24	1.10
15	900	0.25	0.14	0.08	0.08	0.30	1.53
15	1200	0.27	0.14	0.07	0.07	0.24	1.11
20	1210	0.29	0.14	0.09	0.09	0.38	1.11
21	900	0.24	0.13	0.08	0.08	0.34	1.54
21	1200	0.29	0.15	0.08	0.08	0.35	1.11
AVERAGE		0.28	0.15	0.09	0.09	0.36	1.28
0900 AVER		0.27	0.16	0.11	0.10	0.38	1.53
1200 AVER		0.28	0.15	0.08	0.09	0.35	1.11
1500 AVER		0.26	0.13	0.08	0.08	0.40	1.27

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: AUG 1978

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	1.12	0.45	111
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.27	0.43	116
DIFFUSE SKY IRRADIANCE	0.0	0.75	0.19	111
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.52	111
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.64	0.30	84
FRAC TRANS TOTAL SOLAR POSS	0.05	1.16	0.54	84
FRAC DIFFUSE OF TOTAL POSS	0.0	1.14	0.25	84
RELATIVE AIR MASS	0.0	14.73	3.04	428
EXT. COEF. (BASE E)	0.09	3.55	0.81	84

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.55	40
CLOUD COVER (>1/10)	0.40	44
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.06	265
CLOUD COVER (>1/10)	2.98	162
CIRRUS	7.80	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.06	40
CLOUD COVER (>1/10)	0.59	44
CIRRUS	0.0	0

LINEAR REGRESSION: I= 1.027 * TH + 0.032

RELATIVE ERROR OF REGRESSION= 0.129

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: SEP 1978

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	1.14	0.36	315
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.17	0.24	292
DIFFUSE SKY IRRADIANCE	0.0	1.01	0.22	279
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.74	279
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.60	0.22	159
FRAC TRANS TOTAL SOLAR POSS	0.03	1.35	0.52	159
FRAC DIFFUSE OF TOTAL POSS	0.0	1.31	0.30	159
RELATIVE AIR MASS	0.0	14.67	3.26	363
EXT. COEF. (BASE E)	0.17	3.91	1.04	159

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.63	56
CLOUD COVER (>1/10)	0.58	97
CIRRUS	0.79	6

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.32	212
CLOUD COVER (>1/10)	3.10	142
CIRRUS	4.44	9

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.32	56
CLOUD COVER (>1/10)	0.89	97
CIRRUS	1.03	6

LINEAR REGRESSION: I= 1.040 * TH +-0.111

RELATIVE ERROR OF REGRESSION= -0.391

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: OCT 1978

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.85	0.37	270
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.26	0.51	256
DIFFUSE SKY IRRADIANCE	0.0	0.46	0.14	253
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.47	253
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.65	0.35	193
FRAC TRANS TOTAL SOLAR POSS	0.08	2.13	0.59	193
FRAC DIFFUSE OF TOTAL POSS	0.0	1.93	0.24	193
RELATIVE AIR MASS	0.0	14.73	3.88	321
EXT. COEF. (BASE E)	0.07	3.67	0.50	193

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.41	92
CLOUD COVER (>1/10)	0.43	99
CIRRUS	0.77	2

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.70	164
CLOUD COVER (>1/10)	4.01	155
CIRRUS	7.73	2

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.52	92
CLOUD COVER (>1/10)	0.50	99
CIRRUS	0.27	2

LINEAR REGRESSION: I= 0.736 * TH + 0.241

RELATIVE ERROR OF REGRESSION= 2.029

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: NOV 1978

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.71	0.18	248
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.14	0.17	248
DIFFUSE SKY IRRADIANCE	0.0	0.39	0.12	240
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.74	240
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.60	0.28	76
FRAC TRANS TOTAL SOLAR POSS	0.05	1.08	0.60	76
FRAC DIFFUSE OF TOTAL POSS	0.0	0.83	0.31	76
RELATIVE AIR MASS	0.0	14.73	4.75	260
EXT. COEF. (BASE E)	0.13	1.50	0.47	76

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.52	38
CLOUD COVER (>1/10)	0.56	38
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.72	206
CLOUD COVER (>1/10)	4.84	54
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.55	38
CLOUD COVER (>1/10)	0.39	38
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.900 * TH + 0.003

RELATIVE ERROR OF REGRESSION= -0.023

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: DEC 1978

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.48	0.16	217
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.10	0.12	204
DIFFUSE SKY IRRADIANCE	0.0	0.36	0.12	195
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.84	195
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.59	0.19	68
FRAC TRANS TOTAL SOLAR POSS	0.11	1.91	0.68	68
FRAC DIFFUSE OF TOTAL POSS	0.05	1.82	0.49	68
RELATIVE AIR MASS	2.94	14.19	5.83	248
EXT. COEF. (BASE E)	0.06	1.40	0.50	68

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.73	38
CLOUD COVER (>1/10)	0.69	30
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	5.75	188
CLOUD COVER (>1/10)	6.20	57
CIRRUS	11.54	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.57	38
CLOUD COVER (>1/10)	0.40	30
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.334 * TH + 0.133

RELATIVE ERROR OF REGRESSION= 9.113

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: JAN 1979

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.62	0.22	150
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.14	0.18	218
DIFFUSE SKY IRRADIANCE	0.0	0.37	0.15	130
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.67	130
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.61	0.32	51
FRAC TRANS TOTAL SOLAR POSS	0.25	1.38	0.78	51
FRAC DIFFUSE OF TOTAL POSS	0.08	0.95	0.46	51
RELATIVE AIR MASS	0.0	12.59	4.78	248
EXT. COEF. (BASE E)	0.07	1.54	0.42	51

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.66	28
CLOUD COVER (>1/10)	0.55	22
CIRRUS	0.89	1

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.76	193
CLOUD COVER (>1/10)	4.83	54
CIRRUS	6.37	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.51	28
CLOUD COVER (>1/10)	0.31	22
CIRRUS	0.38	1

LINEAR REGRESSION: I= 0.951 * TH +-0.147

RELATIVE ERROR OF REGRESSION= -0.369

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: FEB 1979

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.85	0.22	147
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.81	0.05	237
DIFFUSE SKY IRRADIANCE	0.0	0.60	0.19	144
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.75	144
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.43	0.15	38
FRAC TRANS TOTAL SOLAR POSS	0.14	1.67	0.63	38
FRAC DIFFUSE OF TOTAL POSS	0.09	1.39	0.47	38
RELATIVE AIR MASS	0.0	14.71	4.37	276
EXT. COEF. (BASE E)	0.12	2.26	0.92	38

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.81	19
CLOUD COVER (>1/10)	0.73	19
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.36	226
CLOUD COVER (>1/10)	4.44	50
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.99	19
CLOUD COVER (>1/10)	0.84	19
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.530 * TH +-0.038

RELATIVE ERROR OF REGRESSION= -0.276

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: MAR 1979

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	1.06	0.41	288
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.23	0.38	290
DIFFUSE SKY IRRADIANCE	0.0	0.58	0.19	265
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.59	265
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.64	0.40	139
FRAC TRANS TOTAL SOLAR POSS	0.15	3.21	0.71	139
FRAC DIFFUSE OF TOTAL POSS	0.0	3.00	0.31	139
RELATIVE AIR MASS	0.0	14.73	3.48	354
EXT. COEF. (BASE E)	0.07	3.22	0.57	139

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.46	49
CLOUD COVER (>1/10)	0.43	90
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.33	180
CLOUD COVER (>1/10)	3.64	174
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.71	49
CLOUD COVER (>1/10)	0.50	90
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.432 * TH + 0.455

RELATIVE ERROR OF REGRESSION= -11.19%

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: APR 1979

WAVELENGTH: 0.3 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	1.30	0.33	152
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	1.23	0.20	308
DIFFUSE SKY IRRADIANCE	0.0	0.64	0.22	152
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.71	152
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.63	0.19	69
FRAC TRANS TOTAL SOLAR POSS	0.17	1.21	0.50	69
FRAC DIFFUSE OF TOTAL POSS	0.0	0.82	0.31	69
RELATIVE AIR MASS	0.0	14.72	3.10	395
EXT. COEF. (BASE E)	0.18	3.62	1.25	69

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.75	35
CLOUD COVER (>1/10)	0.56	34
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	2.99	265
CLOUD COVER (>1/10)	3.36	127
CIRRUS	4.19	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.45	35
CLOUD COVER (>1/10)	1.05	34
CIRRUS	0.0	0

LINEAR REGRESSION: I= 1.048 * TH +-0.158

RELATIVE ERROR OF REGRESSION= -0.50%

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: AUG 1978

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.61	0.26	116
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.67	0.28	116
DIFFUSE SKY IRRADIANCE	0.0	0.39	0.10	116
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.47	116
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.34	0.19	85
FRAC TRANS TOTAL SOLAR POSS	0.03	0.65	0.31	85
FRAC DIFFUSE OF TOTAL POSS	0.0	0.63	0.12	85
RELATIVE AIR MASS	0.0	14.73	3.04	428
EXT. COEF. (BASE E)	0.14	3.87	0.99	85

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.49	40
CLOUD COVER (>1/10)	0.29	45
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.06	265
CLOUD COVER (>1/10)	2.98	162
CIRRUS	7.80	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.26	40
CLOUD COVER (>1/10)	0.74	45
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.884 * TH + 0.110

RELATIVE ERROR OF REGRESSION= 1.015

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: SEP 1978

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.58	0.20	367
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.70	0.15	327
DIFFUSE SKY IRRADIANCE	0.0	0.50	0.11	327
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.70	327
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.36	0.13	190
FRAC TRANS TOTAL SOLAR POSS	0.03	0.67	0.29	190
FRAC DIFFUSE OF TOTAL POSS	0.0	0.66	0.16	190
RELATIVE AIR MASS	0.0	14.67	3.26	363
EXT. COEF. (BASE E)	0.16	3.91	1.21	190

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.63	66
CLOUD COVER (>1/10)	0.54	117
CIRRUS	0.65	7

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.32	212
CLOUD COVER (>1/10)	3.10	142
CIRRUS	4.44	9

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.52	66
CLOUD COVER (>1/10)	1.05	117
CIRRUS	1.06	7

LINEAR REGRESSION: I= 1.084 * TH +-0.053

RELATIVE ERROR OF REGRESSION= -0.343

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: OCT 1978

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.49	0.20	324
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.66	0.30	306
DIFFUSE SKY IRRADIANCE	0.0	0.28	0.08	305
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.49	305
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.34	0.19	240
FRAC TRANS TOTAL SOLAR POSS	0.06	1.18	0.35	240
FRAC DIFFUSE OF TOTAL POSS	0.0	1.01	0.15	240
RELATIVE AIR MASS	0.0	14.73	3.88	321
EXT. COEF. (BASE E)	0.10	2.94	0.73	240

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.46	118
CLOUD COVER (>1/10)	0.44	120
CIRRUS	0.76	2

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.70	164
CLOUD COVER (>1/10)	4.01	155
CIRRUS	7.73	2

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.79	118
CLOUD COVER (>1/10)	0.69	120
CIRRUS	0.36	2

LINEAR REGRESSION: I= 0.710 * TH + 0.129

RELATIVE ERROR OF REGRESSION= 2.176

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: NOV 1978

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.40	0.10	272
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.63	0.11	264
DIFFUSE SKY IRRADIANCE	0.0	0.21	0.06	264
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.73	264
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.33	0.16	92
FRAC TRANS TOTAL SOLAR POSS	0.05	0.67	0.33	92
FRAC DIFFUSE OF TOTAL POSS	0.0	0.41	0.17	92
RELATIVE AIR MASS	0.0	14.73	4.75	260
EXT. COEF. (BASE E)	0.17	2.27	0.68	92

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.55	48
CLOUD COVER (>1/10)	0.52	44
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.72	206
CLOUD COVER (>1/10)	4.84	54
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.82	48
CLOUD COVER (>1/10)	0.53	44
CIRRUS	0.0	0

LINEAR REGRESSION: I= 1.053 * TH +-0.039

RELATIVE ERROR OF REGRESSION= -0.253

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: DEC 1978

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.38	0.09	230
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.71	0.09	196
DIFFUSE SKY IRRADIANCE	0.0	0.23	0.06	188
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.81	188
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.38	0.14	66
FRAC TRANS TOTAL SOLAR POSS	0.08	1.25	0.41	66
FRAC DIFFUSE OF TOTAL POSS	0.03	1.03	0.27	66
RELATIVE AIR MASS	2.94	14.19	5.83	248
EXT. COEF. (BASE E)	0.09	1.62	0.61	66

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.72	39
CLOUD COVER (>1/10)	0.60	24
CIRRUS	0.51	3

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	5.75	188
CLOUD COVER (>1/10)	6.20	57
CIRRUS	3.85	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.70	39
CLOUD COVER (>1/10)	0.49	24
CIRRUS	0.47	3

LINEAR REGRESSION: I= 0.446 * TH + 0.084

RELATIVE ERROR OF REGRESSION= 1.381

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: JAN 1979

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.30	0.13	184
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.71	0.17	257
DIFFUSE SKY IRRADIANCE	0.0	0.21	0.07	184
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.61	184
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.38	0.23	89
FRAC TRANS TOTAL SOLAR POSS	0.11	0.92	0.44	89
FRAC DIFFUSE OF TOTAL POSS	0.01	0.63	0.21	89
RELATIVE AIR MASS	0.0	12.59	4.78	248
EXT. COEF. (BASE E)	0.10	1.82	0.47	89

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.51	54
CLOUD COVER (>1/10)	0.47	34
CIRRUS	0.93	1

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.76	193
CLOUD COVER (>1/10)	4.83	54
CIRRUS	6.37	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.47	54
CLOUD COVER (>1/10)	0.48	34
CIRRUS	0.57	1

LINEAR REGRESSION: I= 0.831 * TH + 0.057

RELATIVE ERROR OF REGRESSION= 0.393

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: FEB 1979

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.46	0.12	249
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.69	0.05	269
DIFFUSE SKY IRRADIANCE	0.0	0.30	0.10	238
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.82	238
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.37	0.09	69
FRAC TRANS TOTAL SOLAR POSS	0.09	2.27	0.38	69
FRAC DIFFUSE OF TOTAL POSS	0.05	2.02	0.29	69
RELATIVE AIR MASS	0.0	14.71	4.37	276
EXT. COEF. (BASE E)	0.09	2.78	1.24	69

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.90	38
CLOUD COVER (>1/10)	0.65	31
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.36	226
CLOUD COVER (>1/10)	4.44	50
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.60	38
CLOUD COVER (>1/10)	0.79	31
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.371 * TH + 0.037

RELATIVE ERROR OF REGRESSION= 0.680

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: MAR 1979

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.55	0.22	358
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.71	0.21	325
DIFFUSE SKY IRRADIANCE	0.0	0.44	0.11	321
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.63	321
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.37	0.20	175
FRAC TRANS TOTAL SOLAR POSS	0.05	1.27	0.38	175
FRAC DIFFUSE OF TOTAL POSS	0.0	1.01	0.18	175
RELATIVE AIR MASS	0.0	14.73	3.48	354
EXT. COEF. (BASE E)	0.10	3.71	0.58	175

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.52	63
CLOUD COVER (>1/10)	0.48	112
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.33	180
CLOUD COVER (>1/10)	3.64	174
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.03	63
CLOUD COVER (>1/10)	0.96	112
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.712 * TH + 0.110

RELATIVE ERROR OF REGRESSION= -1.786

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: APR 1979

WAVELENGTH: 0.3 - 0.7 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.71	0.22	403
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.68	0.14	377
DIFFUSE SKY IRRADIANCE	0.0	0.50	0.13	374
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.71	374
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.35	0.14	191
FRAC TRANS TOTAL SOLAR POSS	0.06	1.44	0.33	191
FRAC DIFFUSE OF TOTAL POSS	0.0	1.32	0.19	191
RELATIVE AIR MASS	0.0	14.72	3.10	395
EXT. COEF. (BASE E)	0.14	4.12	1.34	191

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.64	105
CLOUD COVER (>1/10)	0.53	84
CIRRUS	0.81	2

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	2.99	265
CLOUD COVER (>1/10)	3.36	127
CIRRUS	1.40	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.48	105
CLOUD COVER (>1/10)	1.14	84
CIRRUS	2.53	2

LINEAR REGRESSION: I= 0.560 * TH + 0.087

RELATIVE ERROR OF REGRESSION= 0.233

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: AUG 1978

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.54	0.19	111
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.61	0.16	116
DIFFUSE SKY IRRADIANCE	0.0	0.47	0.09	111
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.59	111
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.31	0.16	61
FRAC TRANS TOTAL SOLAR POSS	0.03	0.46	0.26	61
FRAC DIFFUSE OF TOTAL POSS	0.0	0.30	0.11	61
RELATIVE AIR MASS	0.0	14.73	3.04	428
EXT. COEF. (BASE E)	0.14	3.10	1.19	61

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.47	30
CLOUD COVER (>1/10)	0.39	31
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.06	265
CLOUD COVER (>1/10)	2.98	162
CIRRUS	7.80	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.29	30
CLOUD COVER (>1/10)	1.10	31
CIRRUS	0.0	0

LINEAR REGRESSION: I= 1.197 * TH +-0.001

RELATIVE ERROR OF REGRESSION= -0.028

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: SEP 1978

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.78	0.17	315
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.71	0.10	292
DIFFUSE SKY IRRADIANCE	0.0	0.74	0.11	279
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.74	279
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.36	0.10	141
FRAC TRANS TOTAL SOLAR POSS	0.02	0.67	0.25	141
FRAC DIFFUSE OF TOTAL POSS	0.0	0.65	0.15	141
RELATIVE AIR MASS	0.0	14.67	3.26	363
EXT. COEF. (BASE E)	0.25	3.76	1.45	141

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.59	49
CLOUD COVER (>1/10)	0.60	87
CIRRUS	0.83	5

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.32	212
CLOUD COVER (>1/10)	3.10	142
CIRRUS	4.44	9

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.55	49
CLOUD COVER (>1/10)	1.40	87
CIRRUS	1.43	5

LINEAR REGRESSION: I= 0.740 * TH + 0.016

RELATIVE ERROR OF REGRESSION= 0.812

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: OCT 1978

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.45	0.17	270
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.61	0.22	254
DIFFUSE SKY IRRADIANCE	0.0	0.32	0.06	251
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.47	251
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.32	0.16	183
FRAC TRANS TOTAL SOLAR POSS	0.05	0.95	0.27	183
FRAC DIFFUSE OF TOTAL POSS	0.0	0.81	0.11	183
RELATIVE AIR MASS	0.0	14.73	3.88	321
EXT. COEF. (BASE E)	0.14	2.80	0.83	183

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.39	86
CLOUD COVER (>1/10)	0.43	95
CIRRUS	0.79	2

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.70	164
CLOUD COVER (>1/10)	4.01	155
CIRRUS	7.73	2

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.87	86
CLOUD COVER (>1/10)	0.79	95
CIRRUS	0.43	2

LINEAR REGRESSION: I= 0.882 * TH + 0.073

RELATIVE ERROR OF REGRESSION= 0.794

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: NOV 1978

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.40	0.08	248
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.51	0.07	248
DIFFUSE SKY IRRADIANCE	0.0	0.24	0.06	240
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.71	240
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.27	0.12	72
FRAC TRANS TOTAL SOLAR POSS	0.05	0.52	0.26	72
FRAC DIFFUSE OF TOTAL POSS	0.0	0.38	0.14	72
RELATIVE AIR MASS	0.0	14.73	4.75	260
EXT. COEF. (BASE E)	0.24	2.20	0.77	72

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.51	36
CLOUD COVER (>1/10)	0.59	36
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.72	206
CLOUD COVER (>1/10)	4.84	54
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.85	36
CLOUD COVER (>1/10)	0.69	36
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.687 * TH + 0.045

RELATIVE ERROR OF REGRESSION= 4.105

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: DEC 1978

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.24	0.08	217
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.44	0.04	175
DIFFUSE SKY IRRADIANCE	0.0	0.21	0.06	167
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.82	167
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.23	0.08	43
FRAC TRANS TOTAL SOLAR POSS	0.05	0.82	0.30	43
FRAC DIFFUSE OF TOTAL POSS	0.0	0.79	0.22	43
RELATIVE AIR MASS	2.94	14.19	5.83	248
EXT. COEF. (BASE E)	0.17	1.62	0.69	43

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.67	24
CLOUD COVER (>1/10)	0.71	19
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	5.75	188
CLOUD COVER (>1/10)	6.20	57
CIRRUS	11.54	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.72	24
CLOUD COVER (>1/10)	0.66	19
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.082 * TH + 0.121

RELATIVE ERROR OF REGRESSION= -2.579

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: JAN 1979

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.32	0.10	150
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.44	0.06	218
DIFFUSE SKY IRRADIANCE	0.0	0.25	0.07	130
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.71	130
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.23	0.11	49
FRAC TRANS TOTAL SOLAR POSS	0.10	0.61	0.34	49
FRAC DIFFUSE OF TOTAL POSS	0.04	0.47	0.24	49
RELATIVE AIR MASS	0.0	12.59	4.78	248
EXT. COEF. (BASE E)	0.17	1.77	0.70	49

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.73	28
CLOUD COVER (>1/10)	0.65	20
CIRRUS	0.85	1

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.76	193
CLOUD COVER (>1/10)	4.83	54
CIRRUS	6.37	1

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	0.78	28
CLOUD COVER (>1/10)	0.60	20
CIRRUS	0.43	1

LINEAR REGRESSION: I= 0.624 * TH +-0.010

RELATIVE ERROR OF REGRESSION= -0.132

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: FEB 1979

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.42	0.11	147
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.43	0.02	230
DIFFUSE SKY IRRADIANCE	0.0	0.30	0.10	137
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.75	137
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.23	0.06	30
FRAC TRANS TOTAL SOLAR POSS	0.09	0.60	0.29	30
FRAC DIFFUSE OF TOTAL POSS	0.02	0.53	0.23	30
RELATIVE AIR MASS	0.0	14.71	4.37	276
EXT. COEF. (BASE E)	0.25	2.53	1.25	30

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.81	17
CLOUD COVER (>1/10)	0.77	13
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	4.36	226
CLOUD COVER (>1/10)	4.44	50
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.32	17
CLOUD COVER (>1/10)	1.15	13
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.339 * TH + 0.020

RELATIVE ERROR OF REGRESSION= 0.545

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: MAR 1979

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.57	0.19	288
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.59	0.14	268
DIFFUSE SKY IRRADIANCE	0.0	0.36	0.09	245
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.62	245
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.31	0.16	116
FRAC TRANS TOTAL SOLAR POSS	0.06	3.05	0.33	116
FRAC DIFFUSE OF TOTAL POSS	0.0	3.02	0.17	116
RELATIVE AIR MASS	0.0	14.73	3.48	354
EXT. COEF. (BASE E)	0.16	3.71	1.02	116

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.48	41
CLOUD COVER (>1/10)	0.46	75
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	3.33	180
CLOUD COVER (>1/10)	3.64	174
CIRRUS	0.0	0

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.17	41
CLOUD COVER (>1/10)	0.93	75
CIRRUS	0.0	0

LINEAR REGRESSION: I= 0.056 * TH + 0.296

RELATIVE ERROR OF REGRESSION= -2.141

MONTANA STATE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: KALISPELL AREA: FLATHEAD STUDY SITE: GLAC. INT. A DATE: APR 1979

WAVELENGTH: 0.7 - 2.8 MICRON

SUMMARY OF HOURLY MEASUREMENTS OF SOLAR RADIATION

	MIN	MAX	AVE	NO.HOURS
INCIDENT SOLAR RADIATION	0.0	0.59	0.15	152
NORMAL INCIDENT DIRECT SOLAR BEAM	0.0	0.65	0.09	308
DIFFUSE SKY IRRADIANCE	0.0	0.32	0.10	152
RATIO OF DIFFUSE TO TOTAL	0.0	1.00	0.71	152
FRAC TRANS DIRECT SOLAR BEAM	0.01	0.33	0.09	68
FRAC TRANS TOTAL SOLAR POSS	0.08	0.55	0.22	68
FRAC DIFFUSE OF TOTAL POSS	0.0	0.37	0.14	68
RELATIVE AIR MASS	0.0	14.72	3.10	395
EXT. COEF. (BASE E)	0.33	3.76	1.72	68

	AVERAGE RATIO OF DIFFUSE TO TOTAL	NO. HOURS
CLOUD FREE	0.73	35
CLOUD COVER (>1/10)	0.56	33
CIRRUS	0.0	0

	AVERAGE AIR MASS	NO.HOURS
CLOUD FREE	2.99	265
CLOUD COVER (>1/10)	3.36	127
CIRRUS	4.19	3

	AVERAGE EXT. COEF.	NO.HOURS
CLOUD FREE	1.88	35
CLOUD COVER (>1/10)	1.56	33
CIRRUS	0.0	0

LINEAR REGRESSION: I= 1.020 * TH +-0.061

RELATIVE ERROR OF REGRESSION= -0.462

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